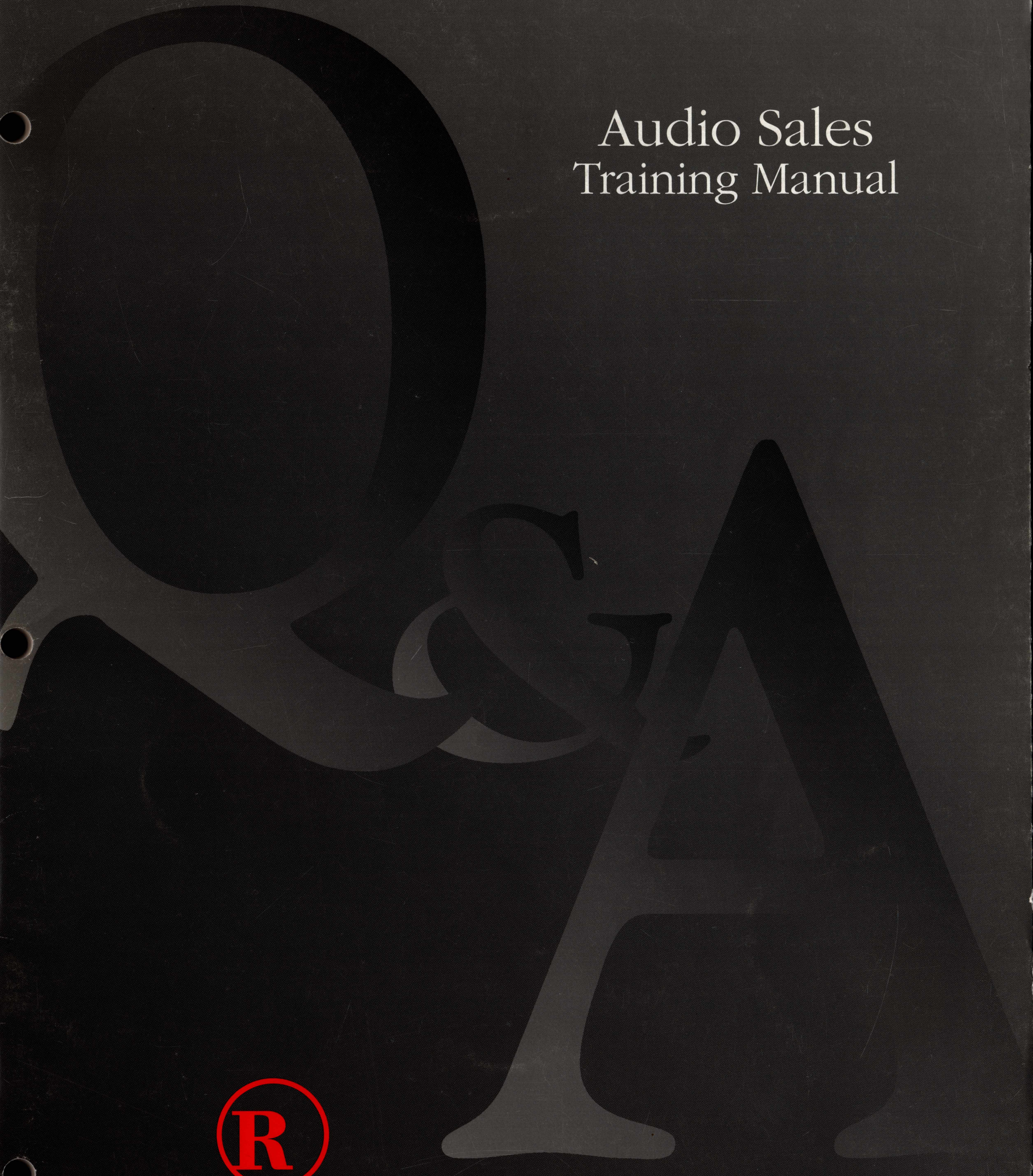
Audio Sales
Training Manual



RadioShack℠

You've got questions. We've got answers.℠

THE FOURTEEN STEPS OF *SERVING* AND *SELLING*

1. **PREPARATION!** Get yourself, your store and your products ready to meet your customers' needs!

2. **APPROACH!** Don't make customers find you! Approach them and let them know you're ready to serve! They came for a reason — make it easy!

3. **GREET!** The basics of good serving are enthusiasm, a warm smile, a genuine interest in your customers, knowledge and appreciation of your products and a determination to make the most of every customer contact!

4. **BUILD A BOND!** The **PROFESSIONAL** server is always working to reduce defensiveness and build bonds of confidence and communication with customers!

5. **UNDERSTAND** your customers' needs, interests and desires! Ask questions and really **LISTEN** to the answers! Nothing builds trust faster!

6. **PRESENT / DEMONSTRATE!** Show that you listened and are competent to help by presenting and demonstrating products that meet their stated needs!

7. **RELATE IT TO THEIR NEEDS!** Help your customers see how the products relate to the needs, interests, and desires they've mentioned!

8. **SHARE THE RADIO SHACK BENEFITS!** If you really care, you want them to have the special benefits that only we can offer.

9. **SEE IF THEY'RE READY!** Ask non-threatening questions to see if the customer is satisfied and your products have solved their problem!

10. **RESPOND TO ANY CONCERNS!** Frequently, the biggest obstacles to helping your customers are their own fears, uncertainties, and doubts! If they don't act now, they may miss the value and potential savings!

11. **HELP THE CUSTOMER DECIDE!** Customers must overcome their fears and **ACT** if they are to have the products they really want . . . today!

12. **GET SOMEONE WHO CAN HELP THEM!** If you can't help your customer, turn them over to someone who can help!

13. **EVERYTHING THEY NEED!** Don't let them forget batteries or cassettes that they will need. Recommend the security of Tandy Service Plans and convenience of **RSVP**! Show them other special values they may desire!

14. **FOLLOW UP!** Thank them and reassure them again before they leave. If appropriate, send a thank you note or call and follow up! Take an interest and continue to serve after the sale!

AUDIO
SALES
TRAINING
MANUAL

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AUDIO SYSTEMS

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INTRODUCTION

The Certification Program

This Certification Program is designed to certify our salesmakers as specialists in particular product categories. These salesmakers become the "Certified Product Specialists" in their store.

The Objectives

The objectives of this program are:

1. to motivate our employees to gain expertise in these product categories;
2. to recognize individual achievement, and thereby;
3. to provide enhanced customer service.

By meeting these objectives, Radio Shack will be developing a sales force who knows the product category and who can take care of the customer. We will be providing our customers with an Experienced Sales Team, and we will be meeting our 8-standard Creed of Guaranteed Customer Satisfaction.

This Certification Product Guide is for the Audio Systems Product Category. All full-time staff, including managers, are expected to become certified in this product category.

Product Knowledge

Every salesmaker will receive a manual for each category of certification. This manual will be a detailed instructional program offering the salesmaker technical and selling skill information. A comprehensive examination will be included.

The salesmaker must complete this comprehensive examination to fulfill the requirement for certification. The salesmaker must score a passing grade of 90% or higher to be certified in that particular product category.

This test will be sent to Sales Training in Fort Worth for scoring. Sales Training will notify the District Sales Manager in writing of those candidates who have passed. Salesmakers who fail the exam can take this exam over again until they pass.

AUDIO SYSTEMS

Selling today's sophisticated audio products requires real professional sales skills and product knowledge. Today's customer is comparison shopping and reading audio magazines to become more knowledgeable about what they need. Customers are consulting with friends and associates and shopping hi-fi stores. So you, the salesmaker, must be prepared for this customer.

Whether you're a new salesmaker or one who's been at Radio Shack for some time, this manual should help you become more familiar and more comfortable with our line of audio products. But this manual alone is not enough. You must take the time to work with the products and to study the owner's manuals, the Radio Shack catalog, the product videotapes and industry magazines to fully understand each product and its features, advantages and benefits.

This manual is not intended to confuse you with technical terms and definitions. It will, however, give you an overall view and discuss important features, along with customer benefits, pertaining to our audio line. Customers don't like to hear complicated technical explanations of the way an audio product works. So everything will be explained in simple, basic terms--which is the way you should talk with your customers.

How do you sell audio systems?

The first and most important thing you need to do is make your store audio-ready. And the first rule in making your store audio-ready is to keep it neat, clean, and organized. Your store should be set up to make the customer feel comfortable and "at home". Nothing turns customers off more than a messy store.

Don Burr, chairman of People's Express, made a comment in a meeting once about the airline industry and the way in which customers perceive things. He mentioned that coffee stains on the flip-down trays told his passengers that his airline had little concern for engine maintenance. His point was that the extra effort you put into your business counts more than you might think.

Always keep stereo equipment dusted, hooked-up with wires hidden, turned on, and ready to demonstrate. Play some upbeat music during the day. It's a proven fact that music creates a shopping environment and makes a store more exciting. And the tempo of the music directly affects the excitement level of customers and the productivity level of employees.

The tempo of the music should be changed in the evenings. Most customers tend to be in a hurry during the day, but they have time to browse at night. So the music should be slower-paced in the evenings.

Since most Radio Shack stores are long and narrow with the music systems displayed toward the front, the music cannot be heard at the back of the store. Customers in the back looking for parts will hear the sound of the air conditioning or heating, or maybe some muffled music drifting back from the front of the store.

So place a set of speakers in the back of your store and connect them to whatever system is normally played throughout the store during business hours. This will create an atmosphere of excitement throughout the entire store, not just at the front.

With your stores filled with organized displays and exciting music, you're ready to sell. Or are you?

Are a wide variety of cleaning accessories available to be used during a demonstration? Does your collection of demo CDs, tapes, or records cover a wide enough range of artists and music styles to please most customers who may want a personal demonstration? Being able to demonstrate your products effectively will significantly increase your success in audio sales--and add-on sales are much easier if you can show and demonstrate their use during your presentation.

Not only should you make your store audio-ready, but you need to make YOURSELF audio-ready as well. And that means being familiar with your merchandise and knowing how to answer the questions your customers will ask. Effective presentations do not always come easily, and you should take the time to learn and practice them.

This manual will help you to become more familiar with audio products. But if you want to be successful in selling audio, take the time to work with the product itself. The customer is very aware when you feel uncomfortable with the product, and it will interfere with your ability to make an effective presentation.

So study the catalog and the owner's manuals, watch the videotapes, and work with the products. Learning is a never-ending process for the professional salesmaker, so keep at it. You'll have more fun--and make more money. You owe it to yourself, to your customers and to Radio Shack.

Selling the *Optimus* Brand Name

OPTIMUS

Optimus is the standard of excellence in audio and our top of the line. *Optimus* offers your customer the very best in high-fidelity audio products. Every *Optimus* component represents the latest in technology, features, styling, and the highest quality standards in consumer electronics. *Optimus* is engineered, manufactured and tested to bring your customer a masterful blend of high technology, high reliability and distinctive, elegant appearance.

Your customer gets the most exciting features, convenience and ease of operation, plus long-term reliability with an *Optimus* product. For premium quality and the finest performance offer *Optimus* audio products to your customers. Since its introduction, *Optimus* is setting new standards in high-tech consumer electronics, so sell it with pride. It's almost impossible to find a system that sounds better than *Optimus*.

Optimus is one of our exclusive brands that is nationally advertised and nationally recognized for quality, long-lasting reliability and value in audio.

A Radio Shack brand name is a sign of quality. When we put our name on a product, we take full responsibility for every aspect of that product. Every item that you sell has been evaluated by Radio Shack engineers and quality-control technicians. No product is ever accepted unless it passes our specifications.

The fact that we put our name on the merchandise we sell means that we are willing to stand behind it. We can do this because we are responsible for the design, quality and service of all our products.

So when customers are in your store comparison shopping, sell *Optimus as* the best of the best in audio and sell the added value of our name brand.

This manual will concentrate on high fidelity audio components. High fidelity means the reproduction of sound with a high degree of faithfulness to the original sound.

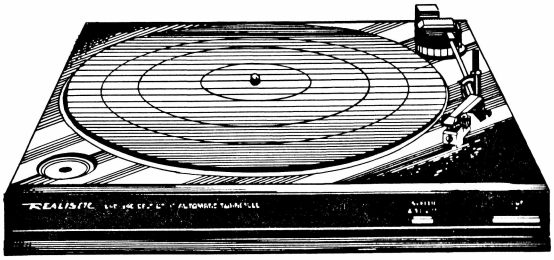
Most people have heard of hi-fi terms like "CD player," "speaker system," "amplifier," "turntable," and so on. These terms refer to products which are essentially the building blocks of an audio system.

Basic Parts of an Audio System

Every audio system consists of three basic parts. First, there must be a source for the music material. This source can be a tuner, a compact disc player, a turntable, or a tape deck. Second, something is needed to control the system and to power the speakers. This is handled by an amplifier/receiver. And the third element is the speaker that converts the signals from the amplifier into the air movement we hear as sound.

Whether it's an inexpensive hi-fi system or the most elaborate one available, they all have these basic parts in common.

TURNTABLES



Records have been with us for a long time, since the turn of the century, and even with the popularity of the compact disc, records are still around. So, whether your customer has a few LP albums or some 45s, that customer needs a turntable to play them on.

The moving part of a turntable is a circular platter. The record is placed on this platter, and the platter rotates at one of several standard speeds--33-1/3, 45, and in years past, 78 Rotations Per Minute (RPM). Adjacent to this rotating platter is a tonearm. In a conventional turntable, the tonearm pivots from one end, and holds a cartridge with a stylus in it at the other end. In a linear turntable, the whole arm moves back and forth across the record.

This cartridge is suspended over the spinning record. When the tonearm is lowered so that the stylus makes contact with the record groove, microscopic wiggles in the record groove cause the stylus to vibrate. The cartridge changes these vibrations into an electrical signal, which is sent by audio cables to the amplifier, and eventually makes its way to the speakers where they are converted to sound.

A turntable platter must rotate at a constant and precise speed. Variation in that speed, whether faster or slower, are specified as wow and flutter. Wow is a result of the speed falling below the standard constant speed. Flutter is the result of exceeding that speed. The lower the percentage of wow and flutter, the better the sound.

In addition, excess motor noise and vibration can also be transferred to the platter and be picked up by the cartridge. This noise is called rumble. A lower rumble rating is preferred for better sound quality.

Direct-drive or Belt-drive

What turns the platter? 75 years ago, Edison used a spring. Today, turntables use a finely balanced, precision electric motor. But a motor can be coupled to the platter in several different ways.

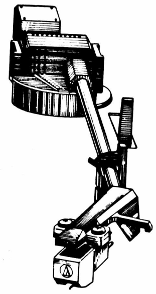
Most turntables are either direct-drive or belt-drive. The belt-drive platter uses a thin, flat, flexible rubber belt to couple the shaft of the motor with the large rim of the platter. Slippage is virtually eliminated as long as the belt stays clean and does not stretch. Motor vibration is dampened or softened by the belt, thereby reducing rumble.

And wow and flutter are reduced because of the effect of the give and take of the elastic band, which compensates for speed changes in the motor due to power changes from the AC outlet. As a result, turntable specs greatly improve.

In the direct-drive system, the motor is coupled directly to the platter, without the need for belts or wheels. It is virtually vibration-free.

There is much controversy as to whether direct-drive is better than belt-drive or vice versa. If you were to compare one of each of equal construction and equal specs., performance would be close if not actually the same. The only advantage direct-drive has is not having to clean or change the belt.

Tonearm



The function of the tonearm is to hold the cartridge, which in turn holds the stylus in place. The entire combination travels across the record surface.

While the cartridge moves laterally across the record, it must press downwards with a certain force to properly contact the microscopic grooves. This weight is called the tracking force and is measured in grams. A dime weighs about 2 grams, while a penny is about 2-1/2 grams.

Counterbalance

The weight of the cartridge is offset by a counterbalance. Counterbalance is a weight located at the opposite end of a turntable's tonearm from the headshell and cartridge. This weight compensates for the weight of the headshell and cartridge. Adjustment of this weight lets you precisely set the tracking force; the pressure of the stylus on the record.

Anti-skating Force

There is a tendency for the tonearm to move naturally toward the center of the record. To offset this, a counterforce is applied to the arm toward the outside. It is referred to as an anti-skating force. The goal is to have the stylus contact the groove in such a way as to bear equally on both side-walls of the record groove, reducing wear on the stylus as well as on the record grooves.

Most tonearms pivot from one point and make a slight arc as they move across a record surface. But when a recording company produces a master record, the cutting head used to make the master moves straight across the record, from the outer edge inward toward the center hole. Since the path used to make a record is different from that used on some turntables to play the record, some tracking error exists. Using exotic tonearm shapes, such as "s" shapes and combinations of curves and straight lines, audio engineers have been able to reduce this error to almost zero.

Linear Tracking

To further improve all tracking error, we sell turntables with linear tracking tonearms. The entire tonearm moves all the way across the record surface without pivoting at one end. The cartridge stays in direct alignment with the record grooves. Thus, the cartridge/stylus contacts the record in the same way in which the masters were produced.

Automatic or Semi-automatic

A turntable may be automatic or semi-automatic. An automatic turntable does not require you to manually lift the tonearm and lower it onto the record surface. All you have to do to start the turntable is press a button. The arm picks itself up, moves over the record, and lowers itself automatically. At the end of the record, the tonearm lifts itself from the record and moves automatically back to its original position. Then the entire mechanism shuts off.

A semi-automatic turntable requires that you manually pick up the tonearm and put it on the record to play. At the end of the record, it will automatically move back to its original position and shut off.

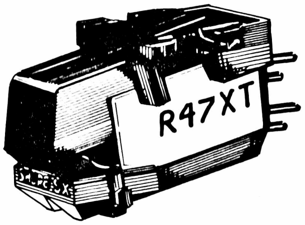
Cueing

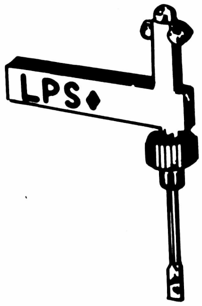
Cueing is a feature that allows you to position the stylus over a specific section of the record and then, with a gentle movement of a lever or button, lower the stylus until it just contacts the record. The same lever or button is used again to raise the arm when the desired selection is finished, if the turntable makes no provision for automatically raising the arm at the end of the record. There are two types of cueing. Positive cueing allows the tonearm to lower itself onto the record without dampening or resistance. The tonearm literally falls down onto the record surface. Viscous cueing provides a dampening to the movement that permits the arm to slowly lower to the record surface, thus avoiding any chance for damage to the stylus or the record.

Repeat Play

Repeat Play is the ability to program a turntable to repeat one side of the record over and over.

Cartridge/Stylus





Of course, no turntable is complete without a cartridge and stylus. Mounted at the end of the tonearm, the cartridge/stylus really determines the quality of sound that will be obtained from a record. Cartridges are either ceramic or magnetic type.

A ceramic cartridge is found in modest lo-fi systems which use an inexpensive stylus. Magnetic cartridges are found in more professional, better-designed systems. A good magnetic cartridge delivers wide, flat response and tracks very lightly to reduce wear and insures prolonged stylus life.

The differences between magnetic and ceramic cartridges can be summarized in their output levels, and their tracking force. Magnetic cartridges track much lighter than ceramic cartridges. Your customer's records will last longer with a magnetic cartridge. A magnetic cartridge produces a lower output voltage and is enclosed in a shielded case. This reduces the possibility of outside interference to the signal. This translates into a cleaner sound being delivered to the receiver.

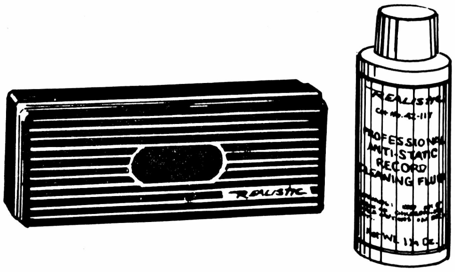
Maintenance

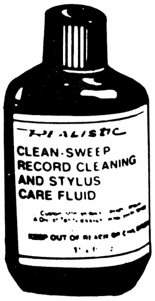
No matter how expensive the turntable, all phono systems need maintenance. The stylus should be checked periodically for wear. A worn stylus can create noise and damage your customer's records. And when not in use, the turntable should have the dust cover in place.

Foreign matter that settles on an unprotected turntable can be transferred to record grooves or stylus, causing poor sound and premature wear. Offer record-cleaning products as add-ons to your customers.

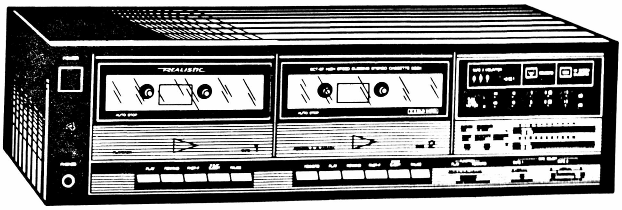
When demonstrating a turntable to your customers, it's important to get them involved. Let them put on a record and play with the cueing. Be ready to answer questions dealing with the difference between belt and direct-drive. Then explain why the more sensitive, lighter-tracking cartridges can provide better fidelity and reduced record and stylus wear.

Point out the benefits of linear tracking. The selection of one of Radio Shack's quality turntables will pay off record after record in savings and extended enjoyment.


Realistic
Realistic
Professional Anti-Static Record Cleaning Fluid



CASSETTE DECKS



The cassette deck and the cassette tape offer ease of operation and excellent audio performance. And our line of Cassette Decks offers the very best combination of high technology, innovative features, superb styling, and value for your customer.

The size of the deck has shrunk making installations in apartment-sized cabinetry or bookshelf placement something that any customer can handle. Finally, connections to the average receiver have been simplified, so that customers no longer have to hire an engineer to get started.

Your customer will have many questions and will be looking for you, the sales professional, for help. In order to help your customer reach a buying decision, you must know how a cassette deck works and what it can offer your customer. You must also have a thorough knowledge of our current line of products, their features and customer benefits.

Review the current catalog and the owner's manuals to gain a better understanding of our line of products.

Tape Specifications

To understand how a cassette deck works, the best starting point is with the tape itself. "Tape" is a thin clear plastic film. A coating of tiny metal oxide particles is bonded to it by a special, flexible glue.

It is extremely important that:

(1) these particles are evenly distributed in a smooth, uniformly thick coating;

(2) these particles point in the direction that the tape moves; and

(3) these particles are packed as closely as possible without actually touching.

If these three specifications are not adhered to, the listener (your customer) will hear more tape hiss. Constant product testing at Radio Shack insures that any audiotape that you carry in your store meets these specifications.

Tape Type

There are three standard types of recording tape. They are:

Type I. Referred to as normal-bias or ferric oxide tape, these tapes are coated with ferric oxide. To the average customer, this coating is known as rust. These tapes can be used with any cassette deck.

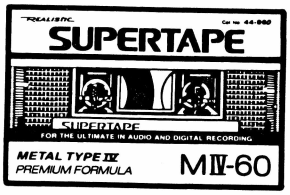
Type II. These tapes, which cost a little more, are called high-bias, chromium dioxide, CR0$_2$ or metal type II. They require a different bias setting, but can be used on almost any deck as long as the deck has a CR0$_2$, Hi-Bias or Type II record bias selector. Some decks can play Type II tapes, but cannot record them. These decks only have the capability of recording Type I tapes.

Type IV. These Metal tapes are actually coated with a material containing metal particles. They are more costly to manufacture and can only be recorded on a deck with a special metal switch position. But once they're recorded, they can be played back on any deck that can play high-bias tapes.

They exhibit the best sound reproduction of any tape, and for that reason alone are most suited to record from digital audio sources such as a compact disc.

If the cassette deck you're selling has the capacity of using metal tapes, stress metal tapes to your customers. Metal tapes will provide maximum performance and give customers the full benefit of what they're paying for in a cassette deck.

Always be sure to sell the customer the best quality recording tape that their machine is capable of using. At the very minimum, the customer should use Metal II tapes, especially if they plan to record from a CD. The Type II metal high-bias tape has been shown to provide the benefits of true Metal Type IV tape without the extra cost of actual Metal Type IV tape.



Tape Lengths

Tape lengths also vary. The most popular lengths are 30, 45 or 46, 60, 76, 90, 100 and 120 minutes. A C-90 tape has 45 minutes capacity per side for a total of 90 minutes. Offer your customer tapes that will match their recording needs.

Bias

When an audio signal is placed on a tape during recording, a high-frequency bias signal is mixed with the audio signal and applied to the tape. This is called bias. This bias signal allows the audio signal to better saturate the tape. This produces a cleaner sound with a minimum of distortion. The better the tape quality, the higher the bias signal, and the better the tape should sound.

Because of these different types of tapes and bias settings, most quality decks have an adjustable bias switch and some have an automatic bias switch which matches the correct bias setting to the type of tape purchased. A better quality tape will lower the distortion, increase the frequency response, and improve the signal-to-noise ratio.

Frequency response, Wow and Flutter, Total Harmonic Distortion (THD), Dynamic Range, and Signal-to-Noise Ratio (S/N) are all listed in the catalog for every cassette deck we sell. Some customers will have an understanding of these specifications and will be comparison shopping. Carefully review the following section in this manual, along with the catalog and the owner's manuals, for a basic understanding of these terms.

When a sound is recorded, it is recorded at a particular hertz (Hz) or standard level of frequency. This sound is reproduced through the cassette deck and played back with some level of distortion. Every component in a stereo system creates some level of distortion in the recorded frequency.

Distortion

Distortion refers to an undesirable difference between an original sound and a reproduction of that sound. Distortion can be caused by flutter, wow, or THD.

Flutter is a wavering sound caused by small, rapid variations in the speed of a cassette deck. It's a distortion in the higher frequencies (6,000 Hz and above).

Wow is the measurement of slow speed variations. It's a distortion in the lower frequencies (below 6,000 Hz).

The lower the percentage of wow and flutter, the better the sound.

THD or Total Harmonic Distortion occurs when the cassette deck introduces sounds into a recording that were not present originally. The lower the THD percentage, the more accurate the reproduction.

Frequency Response

Frequency response refers to how evenly the cassette deck reproduces different frequencies. The range of recorded audio frequencies is normally 20 to 20,000 Hz. This means that the audible range is as low as 20 Hz and as high as 20,000 Hz, and all those in between. The typical human hearing range is 40 to 17,000 Hz. The wider the range, the better the response.

Dynamic Range

Dynamic Range is the difference in decibels (dB) between the softest and loudest sounds a sound source can produce without distortion. Higher ratings are better because they indicate that the cassette deck can more accurately reproduce the full dynamics of recorded music played through it.

Signal-to-Noise Ratio

Hand-in-hand with dynamic range is the Signal-to-Noise Ratio (S/N). S/N refers to how much louder the signal is than the residual noise level, the noise created by the tape passing over the tape head. A higher rating is preferred.

Dolby Noise Reduction

All tapes have their own residual noise level, but as more particles pass the head, the noise level becomes relatively lower. To help reduce this residual noise level, special Dolby Noise Reduction circuitry has been included in all of our recording cassette decks. Dolby is a technology licensed from the Dolby Laboratories that improves the sound quality of a tape. The Dolby B system is more common and is used in home cassette decks. Dolby C is generally found on more expensive decks.

Dolby

Dolby operates as an encode and decode system. A tape, while being recorded must be encoded for Dolby and then, in playback, it must be decoded. Because most of the audible hiss is at high frequencies, Dolby B concentrates on these.

Dolby works by making high-frequency sounds stronger during recording and softer during playback. Dolby is not a noise reducer for existing noisy tapes. It is only a noise reducer for Dolby encoded tapes. It does nothing to reduce the noise of the source. Only the noise of the tape itself can be reduced.

If a tape was recorded with Dolby, then it should be played back using Dolby. Otherwise, the recorded emphasis will sound strange and possibly distorted.

The Dolby B and C systems are industry standards. All of our cassette decks have Dolby built-in, offering your customers recordings that are virtually noise-free.

One problem that can occur with this process is tape saturation. This is caused by the mixing of high frequencies and bias. This mixing sometimes produces a higher bias than needed. The tape itself saturates or overloads easily at high frequencies. When the tape saturates, the subsequent high frequency cut or decoding on playback doesn't fix the problem.

Dolby HX Pro

The latest improvement to the Dolby system is the introduction of Dolby HX Pro. Dolby HX Pro offers a solution to this tape saturation problem. Dolby HX Pro is not a noise-reduction system but an automatic biasing technique that during recording adds signal headroom for high-frequency signals. This allows higher frequencies to be recorded at higher levels with less distortion without tape saturation.

All these systems provide the cassette user with options for optimizing their own recording efforts. Your customers should be encouraged to experiment with them to find the most suitable arrangement with respect to a given tape deck and a given type of tape.

* Dolby is a registered trademark of the Dolby Laboratories.

Now let's turn our attention to the important features available on our cassette decks. Insure that you qualify your customer, get to know their needs and wants, then present the cassette deck that will meet these needs and wants.

Basic Cassette Functions

A basic cassette mechanism provides functions such as play, record, fast-forward, rewind, pause, stop, and eject. But it's the features that go beyond the basics that make these products desirable.

Since a cassette tape can contain many selections, one right after another, one of the most important convenience factors of a deck is how easy it can make finding a selection on one side of a tape that lasts 45 or 60 minutes.

Cue/Review Audible Search

One way of achieving this is by using Cue/Review Audible Search. Cue/Review Audible Search lets you push fast-forward or rewind while in the play mode to quickly search for specific selections of a tape.

ASMS

Another way of achieving this is by using the Automatic Search Music System (ASMS). Decks with this feature can automatically find the beginning or end of a song while in the play mode. The deck literally listens for the "sound" of silence.

With the ASMS feature activated and the deck playing, merely push the fast-forward or rewind button. The circuits will "listen" to the track as the sound flies by. When a silent section is detected of the right duration, the transport will halt and return to play at the start of the next selection or the current selection, automatically, thus saving time when hunting for that specific song.

Intro-Scan

The intro-scan circuit adds another advantage. It checks the track as it fast-forwards. When it senses the selection break, it stops, plays a sample of the next song, and then goes back into the scan mode until the next selection is reached.

Using this feature, customers can preview each item on a tape and stop exactly where desired to play the entire selection.

Tape Counter

The tape counter is often overlooked as a feature. The tape counter changes as the tape moves and can be used to locate specific sections of the tape. This becomes especially convenient when your customer makes a recording. By zeroing the counter at the start of the tape and by making a notation of the counter number at the beginning of each selection, a quick reference index is easily reached using fast-forward or rewind alone. This is only a reference and only good on the machine it was recorded on.

Recording Level Meter

The recording level meter is an indicator that displays the signal levels being recorded onto tape from moment to moment. It is used to set proper recording levels that produce more accurate reproductions of the original sound.

Auto-Stop

Auto-stop is a fairly common feature. When a tape is played and the end of the cassette is reached, the auto-stop mechanism senses the tension on the hub of the supply reel and, after a second or two, stops. This prevents possible tape breakage. Auto-stop shuts off the motor without disengaging the mechanism. Auto-stop only works in the play mode.

Full auto-stop shuts off the motor while disengaging the mechanism, stopping the tape in any mode: fast-forward, rewind, play or record.

Reverse

Auto-reverse takes auto-stop one step further. When the mechanism senses the end of the tape, or when the end of the leader tape has been reached, instead of just stopping its travel, it stops the tape. And then by means of another motor or mechanical assembly, it reverses the direction of the tape movement and plays the other side, automatically. This enables the cassette deck to play or record both sides of a cassette tape without the user having to turn it over manually.

When both decks have auto-reverse it's referred to as Double auto-reverse.

Quick-reverse reverses the tape as soon as the leader tape is detected.

IC Logic Control

Integrated Circuit (IC) Logic Control provides the deck with the ability to go from fast-forward to stop then to reverse without the customer having to press stop. This prevents the tape from being jerked and stretched going from fast-forward to reverse without stopping between these functions. IC Logic prevents damage to the customer's tape.

Dubbing Deck

So far this section has concentrated on one transport, recording or playing one cassette tape. A dubbing deck is one chassis containing two transports, which allows customers to copy from one tape to another. This type of deck may offer a high-speed mode that cuts copying time in half or less. Customers benefit by being able to use one machine to copy personal tapes in half the time it might take with two decks.

Synchro-start dubbing enables the listener to start both tapes at the identical time by the push of one button.

Sequential Play

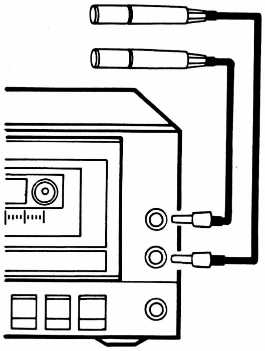
Some dual decks have a sequential play feature. Sequential play means that, without auto-reverse, the deck will play Side 1 of Tape 1 and then Side 1 of Tape 2. On a dual deck with dual auto-reverse, it will play Side 1 of Tape 1, then auto-reverse and play Side 2 of Tape 1. Then, after Tape 1 is finished, it will automatically switch to Deck 2 and begin playing Side 1 and end with Side 2.

This feature allows non-stop listening of over 3 hours of music with 90 minute tapes without your customer having to do anything. The tape will stop after Deck 2 plays Side 2.

Continuous Mode Auto

Continuous mode auto goes one step further and plays 2 tapes in sequence without stopping. Some units will play a fixed number of cycles (both sides of the tape) while others will continue to play until the listener presses the stop button.

Microphone Input Jacks



Don't forget about live recording. Our cassette decks are provided with front panel microphone input jacks. Plug a high-quality microphone into each, one for the left channel, the other for the right. Whether the microphones are used to record a talking letter to grandma or to make a demo tape of a local rock band, live recording is still very much a part of the cassette deck scene. And the microphones also represent an extra add-on sale for you.

Maintenance

All tape decks require maintenance. Radio Shack carries a full line of practical and desirable accessories to maintain any deck in top shape over extended periods of use. For best response and maximum reliability, a quality tape deck should have the recording/playback heads cleaned after every 20 hours of use. At the same time, the tape motion handling parts, capstan, and pinch roller should also be cleaned. Even with the best tape, tape coating residue builds up on these surfaces, and can ultimately cause tape jams, or at least reduced audio response.

After every 10 hours of use, the tape heads should be demagnetized. Extended use of the machine without demagnetization leads to poor sound quality and possible loss of valuable tapes.

Cleaning is done with swabs and a special solvent or a cassette head cleaner, both in the Radio Shack product line.

Demagnetizing is performed with a hand-held unit or one resembling a cassette. The hand-held unit plugs into the wall, while the cassette-type unit is battery-powered. Both generate a demagnetizing field adjacent to the record or play head.

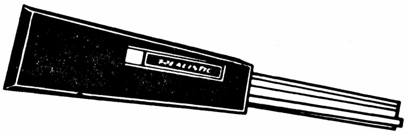
This breaks up the tendency of the metal structure of the head and surrounding parts to become weakly magnetized.

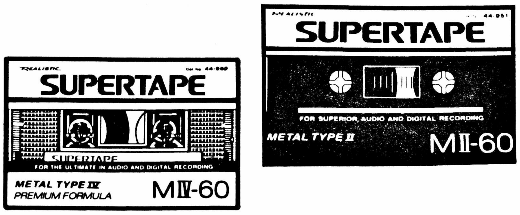
The customer should be made aware that investing a few dollars and a few minutes can result in better fidelity, extended storage and use of prized tapes for years.

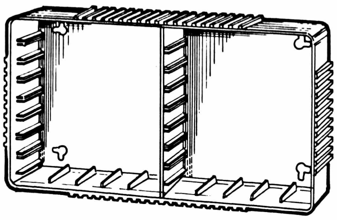
When a customer considers a quality tape deck for an audio system, find out if there is an interest in copying cassettes. If so, a dual dubbing deck is indicated, if not, concentrate on a single transport deck.

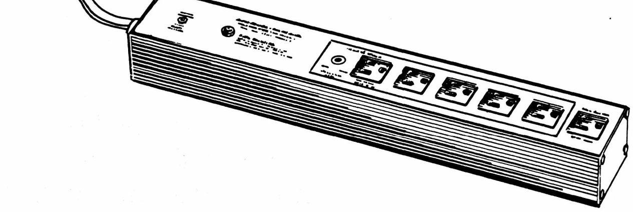
Don't forget the ease of recording with fast response, easy-to-understand LED recording meters, as well as one-finger, feather-touch transport controls in your demonstration/presentation.

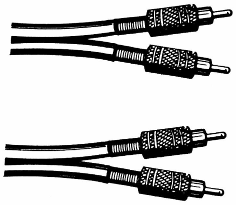
Today, making a fine recording worthy of any audio system, is virtually automatic. Almost anyone can take advantage of the technology that has achieved this end and experience the joy of music.



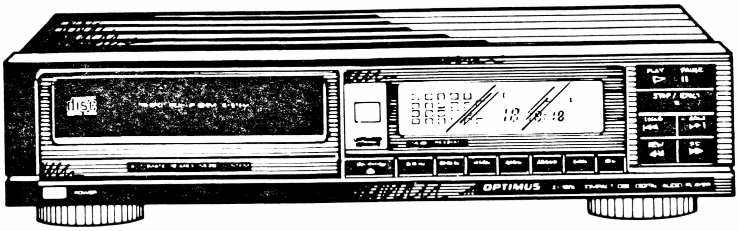

SUPERTAPE
FOR THE ULTIMATE IN AUDIO AND DIGITAL RECORDING
METAL TYPE IV
PREMIUM FORMULA
MIV-60
SUPERTAPE
FOR SUPERIOR AUDIO AND DIGITAL RECORDING
METAL TYPE II
MII-60







COMPACT DISC PLAYERS



Turntables to Cassette Decks to the Compact Disc Player. That's the history of audio technology "source" components. Turntables use records (LPs), cassette decks use tape, and the Compact Disc (CD) Player uses discs.

The disc looks like a miniature version of a phono record, except it's silver. With light striking the disc, it reflects the colors of the rainbow. Musical discs come in two sizes: the standard 5" and the CD single 3". Video discs also come in two sizes: 8" and 12". For more information on Video Disc Players refer to the Video Sales Training Manual.

The clarity of a CD can only be experienced from one other source, the live concert itself. The frequency response, signal-to-noise ratio, and distortion all approach theoretical limits. It took a while to catch on, but the superior audio quality and durability of CDs make them the clear winner over both LPs and cassettes.

The Technology Behind the CD

The CD was developed using computer technology. Audio is converted to a digital language or binary code that a computer understands. This binary code is a string of zeros and ones obtained by converting audio signals into digital data. This digital data is then encoded onto an aluminum surface, and covered with a tough but transparent coating. This is the same plastic coating used for jet airplane windows.

When the disc is inserted into a CD player, the information under this plastic coating is read by a laser beam. The CD player uses a low-power laser beam to read this digital information from the disc. Then it converts this digital information into audio signals.

Tri Spot Laser Tracking

Tri Spot Laser Tracking is a feature offered in all of our CD players. It is the same system used by the rest of the industry sometimes referred to as 3-Beam Pickup. Tri-Spot is Radio Shack's trade name. Tri-Spot Laser Tracking uses a single laser that splits into 3 beams. These three beams read and track the digital information on the disc.

Sampling Frequency

The Sampling Frequency is the speed at which the CD player can read or process this digital information on the disc. The sampling frequency is fixed for all CDs at 44.1 kHz (kilohertz).

Signal Processing Rate

The Signal Processing Rate is how fast the CD player can process the digital information on the disc. This rate is similar to the clock speed in a computer. The Signal Processing Rate will be the same as the Sampling Frequency for CD players without Oversampling or 44.1 kHz.

Oversampling

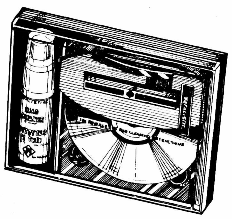
Oversampling refers to the number of times that the digital information on a CD is rechecked to assure accuracy in the reading or processing of this information. The more times this digital information is rechecked, the better the output, the clearer and cleaner the sound.

Two-times Oversampling means that the digital information is rechecked twice for accuracy. The Signal Processing Rate is now 88.2 kHz or 2 times the sampling frequency of 44.1 kHz.

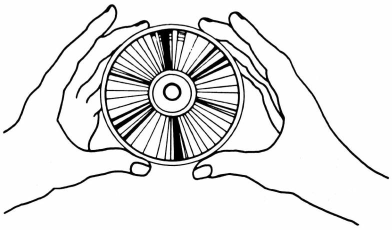
Four-times Oversampling means that the the digital information is rechecked four times for accuracy. The Signal Processing Rate is now 176.4 kHz or 4 times the sampling frequency of 44.1 kHz.

Care and Handling of a Disc

A CD can contain up to 1-1/4 hours of playing time. The information is read from the side opposite the screened label. Should a fingerprint get on the disc, in most cases the player won't even notice it. If the disc really gets soiled, Radio Shack offers a selection of CD cleaners that will solve the problem. It's a natural add-on to a CD sale.



The CD player can do something even more miraculous. When a phonograph record gets scratched, the sound at that point is gone forever. But because of the computer circuitry inside a CD player, a minor scratch on the disc will never be heard. The circuit reads the data on either side of the "missing" music and generates replacement information. To your ear, and your customer's, everything sounds fine.



Always hold the CD by the edges and always keep the CD in its protective case or sleeve when it is not in use. Fingerprints and scratches on the CD's surface can prevent the laser beam from correctly reading the digital information. Remind your customers, that with simple care, CDs can last virtually forever.

Compact discs are designed to be played only on a CD player and some laser vision players. There are no adapters for using them on turntables or other audio components.

Basic Operation

After the power switch is pressed, touch the button that indicates Open/Close. A panel on the player will slide forward, revealing a tray with circular cutouts within it. Just drop in the disc with the label upwards. There is no threading, no alignment, and no other preparation. Let the customer see just how easy it is. Push the Open/ Close button again and the drawer slides smoothly closed once more.

Once the drawer is closed, the CD player's computer-like circuits take over. The laser scans the disc and displays, in numbers on the display, the total playing time of the disc and the total number of selections, or tracks, on the disc. All of this data has been encoded on the disc at the time of manufacture. It then readies itself at the first track, waiting the press of the Play button.

At this point the customer, wishing to listen to, for example, all of the tracks, touches the Play button and the disc begins. However, there are several other options.

Now let's review some additional features found on CD players.

Pause/Cue

Pause/Cue lets you temporarily stop play and restart the music from the point of the pause, or cue a track for play at a later time. When someone is at the door or if the phone rings, you need not miss parts of the selection being played or have to go through some fancy footwork to put the CD player on hold. Just a touch on the Play/Pause button instantly freezes the player. When the interruption is over, another touch of the button and the music starts at the same note where it left off; nothing is added, nothing is missed.

Audible Search/Audio Search

Audible Search/Audio Search helps you locate a particular section of the music by playing the CD rapidly in either direction.

ASMS/Track Selector

The Automatic Search Music System (ASMS) or Track Selector button helps you find selections quickly. Simply press the button and the player skips to the beginning of any track before or after the track presently being played.

Intro Scan

Intro Scan provides a 10 second "preview" of selections. Press Intro Scan before or during play, including the memory program play. Intro appears on the display and the CD Player plays only the first 10 seconds of each track. Press Intro Scan again to resume normal play.

Shuffle Play

The Shuffle Play feature randomly selects tracks from all of the loaded discs, in a multiple disc CD player. After one track plays, the CD player automatically selects another track from any of the loaded discs until it plays all tracks on all discs.

Auto Space

Auto Space automatically puts a 2- to 5-second blank space between tracks on a tape. *Space* will appear on the display. Press [Space] again to cancel the space function. Such spaces are necessary for proper operation of the ASMS feature.

Auto Edit

The Auto Edit feature is very useful for dubbing a CD onto a cassette tape for your personal use. You can easily program tracks to fit on a standard cassette tape. For example, if you want to record a CD onto a cassette tape that has 30 minutes of recording time per side, the CD player automatically programs all tracks that can fit in the 30-minute time allotment. Check the owner's manuals for cassette type and the recording length of each side of the tape so that you are better prepared to answer your customer's questions.

Index Display

The Index Display is found on some CDs. Some CDs and laser discs are divided into smaller subdivisions than tracks. These divisions are marked by index numbers. If a CD player has an index display, you can search for and/or program play of the CD beginning at these points. During play, you can view the current index number by pressing [INDEX]. The display shows the current index number in place of the track number. You can then use audible search to locate the desired index.

It is most commonly used with opera and classical selections where a single selection or overture could be 10-15 minutes--much longer than the average song. The index information must be recorded on the disc for the player's index feature to work.

Digital Display

Digital Display gives you a variety of displays including total number of tracks, total playing time, current track or index number, and elapsed or remaining time.

Music Calendar

Music Calendar is a feature on some CD players that is a visual display of all the tracks on the CD. In the programming mode, the music calendar displays only the tracks that you have programmed. This is an important feature for your customer, because it lets them know that the tracks that they programmed have been accepted by the CD player. The music calendar lights up these numbers (tracks). Once the track has played, the number disappears from the display.

Remote Control

Remote Control is included with some CD players for customer convenience and ease of use from the customer's easy chair.

Programming the CD

Unlike most record players, you have the ability to randomly program a CD player. Most albums have at least one song that someone won't want to listen to. Or there may be one or two selections that the listener wants to hear over and over.

Program/Memory Button

Use the program/memory buttons on the CD player to choose which of the tracks on a disc are to be played and in what sequence. For example, one person may want to hear tracks 1 and 2 only. Another may wish to delete track 5. And someone may want to hear the tracks in reverse order. All of this is at your customer's command.

Repeat Play

Repeat Play lets you automatically repeat the entire CD in sequence, any single track you select, or a series of tracks that you programmed.

A-B Repeat

A-B Repeat lets you repeat any segment of the CD without limiting you to the beginning and end of the tracks. During play, press [REPEAT A-B] at the desired starting point and again at the desired ending point. To stop repeating the segment, press [STOP].

Random Track Play
Sequence Programming

Random Track Play is a CD player feature that automatically arranges and plays the tracks on a disc in a random sequence. Another CD player feature, Sequence Programming, was called Random Sequence Programming on early CD players. This feature allows the user to program tracks to play in any sequence they choose. Of course, this is not "random" and that is why the name of this later feature has been changed.

Refer to the owner's manuals for a step-by-step process of how to program your CD players for this feature.

Questions Customers Ask

Here are several basic and most-encountered questions customers ask.

"Are CDs going to make phono records obsolete?" Yes...someday, but not right now. Music companies are making more CDs and fewer records. If you go into any music store, CDs are taking over more and more shelf space. The music software industry is slowing down in record production and producing more CDs. A concerted effort by the major software companies is being made to build new factories for CD production.

"Is it true that using a CD player requires that I buy a more powerful amplifier?" Not necessarily. If your music is low-level or easy-listening type, your present amplifier should suffice. But if you wish to retain the dynamic range of a live concert, such as from the soft triangle to the blast of the cannon in the 1812 Overture, more power may be needed. We will be discussing amplifiers later in this manual, so review that section for answers to your customer's questions.

"I've heard that lasers are dangerous. Can the laser in this product hurt me?" The CD player contains a special low-power laser which has a beam that is carefully focused on the spinning disc. Only if all safeguards are bypassed, and the case is disassembled so that you can place your eye adjacent to the beam can it be considered dangerous. This situation could never happen by accident.

Customers often want to understand dynamic range. Have you ever noticed while listening to a radio station that all sounds, announcer's voice, strings, bands, and singers are at the same volume level? That is because the station compresses the dynamic range, enabling it to be broadcast efficiently. Consider a symphony orchestra instead. You may hear the crash of cymbals and the shock of the bass drum followed by a whisper-quiet tap on a triangle. The loudness levels of real life are great in their differences. This difference between the loudest and softest volume levels, then, is the dynamic range that can be captured in a CD. It makes a powerful demonstration for your customer.

Selling the CD Player

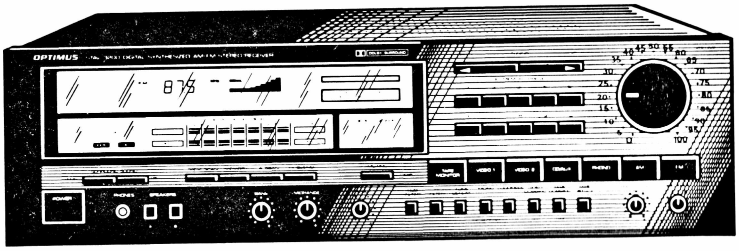
When customers come into your store looking for ways to improve their music system, ask them if they've had the opportunity to listen to a compact disc player. You would be surprised at the number of people who have heard of CD players, but who have not listened to one.

Just having a CD player operating in your store all day is not enough. Personal presentation and demonstration is vitally important. A quick comparison to a record on a turntable or a tape in a cassette deck will overwhelm even the least interested customer. You won't sell a CD player to everyone you meet. But the more people who hear it, the greater the odds are in your favor that they'll want it.

After a new product has been around for awhile, sometimes we tend to take for granted that everyone is familiar with it. Don't get caught by this fallacy. Assume instead that all your customers have just come back from a 5-year expedition to outer Mongolia. It's your job to bring them up-to-date on the latest and greatest in our line of CD products.

Give your customers the opportunity to see and hear the great sound quality of our line of CD players. Don't forget to have a portable CD player with headphones at the counter for every customer to hear as you enter the sale at the POS terminal. Let them load your demo disc. Emphasize the durability and noise-free sound of the compact disc, and stress the advantages of digital music over analog music. Let them hear the difference for themselves. The clarity of the sound and the audio impact, which produce a degree of startling realism never before available for the home stereophile, will almost sell the player for you.

RECEIVERS



Some people think of a receiver as just a tuner and an amplifier combination. It is--but it is so much more. The flexibility and versatility built into our receivers are unmatched for the value your customer gets.

Consider the receiver as the hub of the audio system. It may even be called a control center. The reason is that it provides all the controls--volume, tone, input selection--necessary to permit the customer to choose and manipulate the high fidelity sound it finally transfers to the speakers.

Further, it combines a quality tuner to bring in the customer's favorite FM or AM stations with clarity and precision never before achieved at the present market cost.

The receiver also includes the circuitry needed to amplify and control the output of accessory components, such as a turntable, cassette deck, or compact disc player.

In addition to input jacks for phono or tape, generally one or more auxiliary or high-level jacks are provided. These permit connection of virtually any audio source, such as the audio output of a VCR, Compact Disc or Laser Disc Player. Receivers are engineered for versatility and flexibility because they are the key to any audio system.

How much power does it have?

One aspect of a receiver which demands your guidance is the question of power. The customer, invariably, wants to know, "how much power does it have?"

People don't understand how much power they really need in a receiver. The amount of power needed is determined by room size, speaker size, and to an extent, the listening habits of the customer. So it's imperative that a professional salesmaker ask appropriate qualifying questions to identify where and how the receiver is going to be used. Review the BASIC RETAIL SELLING SKILLS MANUAL on Qualifying for further guidance, if needed.

The majority of our audio receivers are 100 watts and are designed for extremely wide dynamic range changes. If the customer wants a system designed for background music or for a second system, recommend a smaller wattage; 50 watts or under is generally needed.

Some customers simply equate more power with loudness. They might think that a slight increase in wattage will blast them out of their chair. Not true. A ten-time increase in power may only result in the feeling of doubling of a given loudness level. In other words, a 100-watt receiver will not play twice as loud as a 50-watt unit. So what is the customer really getting when they double their amplifier power? Reserve power.

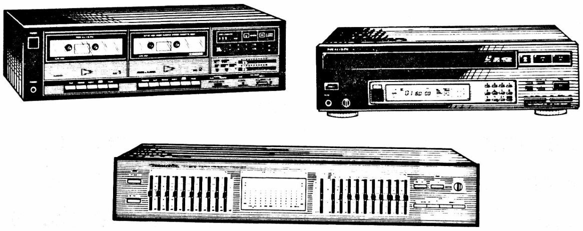
Reserve Power

It's not that the high power is used constantly, but with the peaks and valleys of music, and the wide dynamic range changes, especially with CD use, a sudden boom of a bass drum or a low note on a bass guitar requires an instant surge of power. If that reserve power is not there, the sound you hear is distorted.

An auto engine doesn't always use its total horsepower. But when you really have to move to get on the highway, it comes in handy.

There was a time when the power rating of an amplifier or receiver could be different from one company to the next for the same product. That's when the Federal Trade Commission (FTC) stepped in to standardize the industry. To this day, all manufacturers of amplifiers and receivers follow the same basic guidelines for power output.

Be certain to emphasize that power alone isn't everything in a receiver. Since the receiver is the heart of the system, flexibility for today and for the future needs and expansion of the customer's system must be pointed out.



Possible add-on components might be a cassette deck, equalizer, CD or laser disc player.

And in today's market, with the marriage of audio and video, a hi-fi or stereo VCR is definitely a desired component for your customer.

How do specifications help you sell?

You should be familiar with the following specifications. These specifications are listed in the catalog for each receiver:

Amplifier Response

Amplifier Response is the same as Frequency Response. It represents how the component reproduces different frequencies. Amplifier response deals with amplifier output. A wider rating is always better.

Signal-to-Noise Ratio

Signal-to-Noise Ratio refers to how much louder the signal is than the residual noise level. A higher signal-to-noise level ratio means little or no perceivable background noise.

Capture Ratio

Capture Ratio tells you about the tuner's ability to discriminate between two signals on the same frequency. The smaller the number the better.

FM Tuner Sensitivity

FM Tuner Sensitivity is the ability of an FM tuner to produce clear, clean sound from a weak signal. The lower the sensitivity rating, the better the tuner is at receiving weak signals.

IF Rejection

IF Rejection measure the tuner's ability to reject unwanted signals. The higher the better.

Stereo Harmonic Distortion

Stereo Harmonic Distortion is similar to Total Harmonic Distortion used in cassette decks. It is the percentage difference of distortion between the original sound and the reproduced sound which includes multiples of the original frequency. THD occurs when the component introduces sounds into a recording that were not present originally.

Channel Separation

Channel Separation is the ability of an amplifier, tuner, or other stereo device to limit the signal from one channel (left or right) from leaking into the other channel. The higher the rating, the better the stereo image will be.

Low Distortion

Low Distortion is the amount of distortion that is not audible. If an amplifier has low distortion even at its full rated power output, you get a cleaner sound from your system even at higher volume levels. It lets you use the full power of the amplifier without compromising the sound quality.

How will features help you sell?

To close more sales, you must know the main features of a receiver?

Bass, Mid-range, Treble Controls

Of course, separate bass and treble controls, which for most situations will allow adjusting of the overall sound to please your customer's personal taste and room acoustics. Many high-end units include a mid-range control for greater versatility.

Bass is the lowest portion of the audio spectrum, roughly 20 to 1,000 Hz.

Mid-range is the frequency between bass and treble, generally 1,000 to 7,000 Hz.

Treble is the higher audio frequencies, above 7,000 Hz. to 20,000 Hz.

Loudness Control

Then there are special controls, such as a loudness control, which gives a marked increase in bass. This is needed for low volume listening to make up for the fact that at low levels the human ear is less sensitive to bass.

Subsonic Filter

A subsonic filter control insures that the low end is clean and free of power-robbing distortion. The high-filter takes out the scratches of well-used records and some of the hiss from a noisy tape.

Hi-Blend

The Hi-Blend button reduces the noise that might occur during FM stereo broadcasts in weak signal areas. This button has no effect on AM broadcasts.

Digital-synthesized Tuning

The most important section, after the primary amplifier, is the tuner. The technology used today provides tuner accuracy and convenience once only dreamed of. Most integrated tuner/amplifiers today use digital-synthesized tuning. This is a type of radio tuner that uses an extremely accurate crystal frequency source as a reference to synthesize all other frequencies. Similar circuits are also used to synthesize frequencies for TV/radio transmitters. These tuners are equipped with an easy-to-read frequency display that can be read from across the room. The display makes fast and precise tuning of your favorite FM or AM station easy.

Automatic Scanning

Now, add to this the fast tuning feature of automatic scanning, and the tuner takes over for you. Pushing one button starts it searching, either up or down the band in increments of 0.2 MHz for FM and 10 KHz for AM, looking for the next station with strong reception.

If you think your customers may be tired of looking up the frequency of their favorite stations over and over, then memory presets will enable them to return to a station with the push of a button.

With programmed memory tuning, the customer tunes the station one time, chooses a memory storage button from many different FM and AM possibilities, and locks the tuning information into that chosen location.

The next time the customer wants to listen to that station, all they need to do is press the memory button, and there it is.

This manual basically addresses only digital receivers. Digital has become the standard for high-end equipment, due to its accuracy and ease of use. Analog is still around, but its popularity is decreasing rapidly.

FM Mute

As you manually tune the FM Band, you will notice static. The FM Mute control takes out the noise. Let customers tune between stations and hear the static noise. Then have them press the FM Mute button. They'll notice the difference immediately.

Tone Defeat

Tone Defeat, with one-control operation, bypasses any existing settings of the tone controls, without disturbing their settings for future use (similar to the Bypass button on an equalizer). This action sets the amplifier back to flat response, which provides reproduction with no enhancements.

Mono Button

The Mono button instantly switches the FM tuner from stereo to mono operation. When a stereo station is received with a weak incoming signal, it may be noisy. Using the mono control will generally provide a cleaner sound, but the sound that customers will hear will be monophonic.

This means that the sound source is coming from only one speaker or the same sound source is coming from a pair of stereo speakers. When the same signal is played through a pair of stereo speakers, the sound should appear to be coming from a single point somewhere between the two speakers. If the sound appears to be coming from a point half-way between the two speakers, the system is usually balanced for stereo sources.

Tape Monitor

When a tape deck is connected to the Tape IN and Tape Out jacks, the Tape Monitor feature permits the customer to make an instant A-B comparison between the sound from the source and the sound that is being recorded on tape. This helps to assure a good quality recording.

Tape monitor jacks can also be used to provide an input for accessories such as an equalizer, reverb, or a cassette deck. Tape Out is the only jack on most receivers that provides an output before the final amplifying stage. This output is normally used for recording purposes.

Some receivers have two pairs of tape monitor jacks. Having two sets of tape jacks allows customers to record with two cassette decks at the same time from a single source, such as the FM Tuner. Also, if the customer wanted to connect an equalizer and a reverb to the receiver but use them independently, you would simply connect one to the first tape monitor set while the other unit would be connected to the second set. Then the customer could easily switch between the two.

A/B Speaker Switch

The A/B speaker switch makes it possible for customers to add a remote pair of speakers in another part of their home.

Now the receiver can be in one room while the listener relaxes with their favorite music in another. Each set is independent of the other, although both are controlled by the master volume setting.

Alphanumeric Display

The Alphanumeric Display, by combining letters and numbers, shows the radio frequency, preset memory number, program source, signal strength, and other information.

AV Dubbing or Video Dubbing

AV Dubbing or the Video Dubbing button lets your receiver copy a video cassette tape from one video player/recorder to another.

Output Power Meter

Output Power Meter lets you monitor your system's outputs. This meter shows the approximate amount of power your receiver/amplifier channels are delivering.

Questions customers may ask

"Can I connect more than four speakers even though the owner's manual recommends not exceeding four?" While it's possible, casually connecting more than four can overload and possibly damage the receiver. Without a specially-designed impedance-matching switch control center, which allows 8 speakers to be used as long as all speakers are 8 ohms, you're just asking for trouble.

Do not advise customers to try any home-grown design of a unique, parallel/series hook-up to override the recommendations in the owner's manual.

If customers have a special need for a multiple speaker hook-up, refer them to our PA amplifiers that have 70-volt line output. We also carry a 70-volt line transformer that can be used on their current system. This item is available from the Consumer Mail Center.

The customer may ask: "What is the difference between a switched and an unswitched AC outlet on the back of the receiver?" A switched outlet is controlled by the front panel power switch. So, the AC line cord of a turntable, for example, would not be the correct thing to plug into it.

Why? Let's say you were listening to an album, and you decided to turn your system off. If you turn the power off on the receiver, what happens to the turntable? The motor quits turning and the platter comes to a stop, in the middle of a song. The stylus could leave a burr on the record surface.

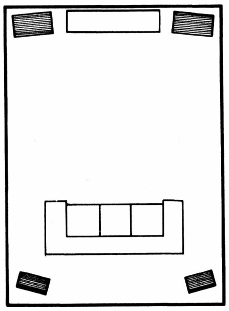
An unswitched outlet is not controlled by the front panel switch. As long as the receiver is plugged in, the unswitched outlet is "live". This would be the better choice for a turntable or CD player.

Some customers may ask about the power rating next to the AC power cord on the back of the receiver. This power rating indicates the maximum amount of power the receiver would consume from an AC outlet at any given time. It should not in any way be confused with the output power capability of the receiver. This rating is a UL requirement.

Provision is made on all of our receivers for an external antenna hook-up. This could be used to hook cable, rabbit ears, or an external TV or FM antenna for improved FM reception.

Additional features include:

Dolby Surround Sound



Dolby Surround Sound. The idea behind Dolby surround sound is to increase the realism of video programs by providing thrilling "theatrical" effects. This is done by sending directional sounds (music and dialogue) or main action sounds to the front left and right speakers, and by sending environmental sounds (thunder, street noise, etc.) to a pair of rear or side speakers. You are literally "surrounded" by sound. You feel like you are a part of the scene. That the activity happening on the screen is happening to you. This technology dramatically enhances regular stereo sound and lets your customer recreate that "at the movies" feeling in their own home. Dolby Surround creates an action environment.

With more and more customers renting movies encoded with Dolby Surround Sound, this feature has added value. To get the full benefit from Dolby-encoded video tapes, your customer needs a stereo VCR or laser video disc player.

Some video tapes, video discs, and stereo television broadcasts are encoded with the special Dolby surround sound signal. These sources sound best with the receiver's Dolby surround sound feature; however, your customer can use Dolby surround or Hall effect to enhance any program source.

Become familiar with surround sound and read and study the owner's manuals of the receivers that we carry so you can answer your customer's questions about hook-up and speaker positioning.

Hall Effect

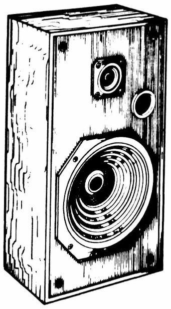
Hall Effect recreates the depth and realism of a concert auditorium from almost any stereo source. Hall effect sound is best suited for recorded concerts and other music programs. In this mode, the front speakers provide a normal stereo effect while the rear speakers provide reverberation of the sound. This reverberation simulates the sound you might hear at a live concert.

Matrix Surround Sound

Matrix Surround Sound is a feature that creates 4-channel (right, left, front, rear) from any stereo sound source. No special encoding, like that of Dolby, of the sound source is necessary.

Our receivers provide accuracy, convenience, and value. Study the catalog and work with the products until you are comfortable demonstrating the features and sharing the benefits with your customers. Remember, you are doing your customer a favor when you sell them Radio Shack products.

SPEAKERS



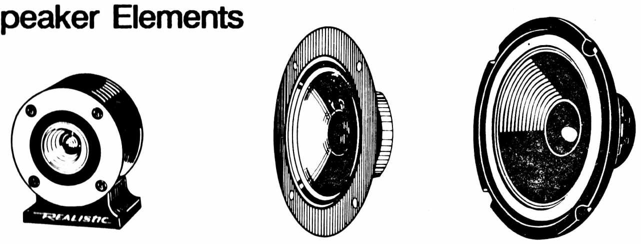
Speakers are the last link in the audio system chain. No stereo system can sound better than its speakers. So care should be taken in choosing the right ones to complement a stereo system. The result will be the best sound the stereo is capable of producing. Speakers range in price from a few dollars to thousands of dollars per speaker.

A system without speakers produces no sound. Why? Because the function of the speaker is to convert electrical audio signals carried in a wire to mechanical energy or physical motion which in turn produces sound. The best speakers offer more precise reproduction of sound than their less-capable counterparts.

The more closely the motion of the speaker cone follows the signal that drives it, the more faithful the reproduction of the original sound will be, assuming all else is as accurate as possible. Radio Shack's world-class engineering and development team is always searching for better ways to build speakers and create even better-quality sound reproduction.

We know that no single speaker by itself is sufficient for the best reproduction. Thus, a speaker cabinet generally has several component speakers within it, each specially designed to reproduce a section of the audio spectrum--such as high notes or low notes--and do it accurately. That's why better-quality high-fidelity speakers have at least two speaker elements, a woofer and a tweeter.

Speaker Elements



Tweeter/Woofer/Mid-range

A tweeter is a speaker built specifically to reproduce the higher frequency sounds such as violins and flutes. A woofer reproduces low frequencies such as the sound of drums and other bass instruments. A speaker with a woofer and a tweeter, two elements, is called a two-way speaker.

The best-quality speakers are three-way speakers. They have a woofer for the low-range sounds and a tweeter for high-range sounds, but also have a mid-range speaker for the frequencies between the extremes of low and high. For example, the vocals of a song or the average announcer's voice fall into this area.

Crossover Network

A special circuit directs the proper range of frequencies to the speaker which can handle that range best. This is called a crossover network. The cross-over network sends the high frequencies to the tweeter, the mid-range sounds to the mid-range speaker, and the bass end to the woofer.

Full-range Speaker

There is another speaker that should be mentioned, the full-range speaker. If your customer has a limited budget and desires a bookshelf-sized enclosure, the full-range speaker fills the slot perfectly. Even though this type of speaker driver looks like an ordinary speaker, its performance is much different. The unit is an audio compromise in that it reproduces a wide range of the audio spectrum. However, it is incapable of delivering the overall quality provided by separate drivers.

Radio Shack offers several speakers, or components, each designed to work best in a given sound range. For an overall presentation, they must work together in a properly-designed enclosure. Such a cabinet is designed and constructed to not only look good, but also to sound good. It must augment the abilities of each of the components within.

Cabinet Design

Two of our most popular cabinet designs are named for the method each design uses to achieve the best results from the speakers inside.

Bass-reflex Design

A bass-reflex enclosure makes use of the sound wave that the speaker cone creates that normally would be trapped in the cabinet. Since the cone of a speaker moves back and forth, half the air mass, practically speaking, is all dressed up with no place to go. By cutting a hole in the front wall or baffle board of the cabinet, of just the right size and shape, we allow that back wave to turn around and come out the front, in step with the forward wave, reinforcing it.

This hole is called a tuned port. Because we get more bass reinforcement than without this port, the bass reflex design is more efficient requiring less delivered power from your customer's amplifier. The net result is greater bass impact at a lower volume.

Acoustic Suspension Speaker

Acoustic suspension speakers use a somewhat different approach. This design does not use the back wave to reinforce the front wave. Instead, the cabinet becomes the key to the uniqueness of the design. The cabinet is made airtight. Speaker engineers can use this sealed cushion of air with the same effect as a shock absorber. This allows the woofer to have a dampened cone motion, using the air inside like a big pillow.

Each of your speakers will have a maximum power-handling capacity, which is the maximum short-term signal power that the speaker can handle without danger. The higher the rating the better.

In the lab, an engineer may generate a continuous tone with a sound generator, which is connected to a test speaker. This continuous tone is normally used to determine, in several hours, the maximum power capacity of the speaker, and its effectiveness to dissipate heat. But this is unlike the real world of music.

Music does not consist of continuous tone signals. It is comprised of many levels, peaks and valleys. The speaker may be used up to the stated maximum power capacity, knowing that these peak periods last only for a split second. Because of the rapid rise and fall of the input power, no sustained heat-generating energy is involved. This is referred to as "short-time peak power factor."

Speaker Size

Aside from overall design, what other factors influence sound quality? The size of the speakers certainly do. The diameter of the woofer is probably most discussed in audio circles. All else being equal, the greater the diameter of the woofer, the greater the amount of air mass that can be moved by that speaker through the listening area, and the more pronounced the bass will be.

Frequency Response

Frequency response is another important characteristic in judging speakers. The theoretical limits of human hearing are accepted as extending from 20 Hz, or cycles per second, to 20,000 Hz. However, most people have hearing that doesn't quite reach those extremes (a simple head cold can reduce almost all the upper end of treble, for example). The true audiophile wants equipment that is able to reproduce this entire range. The more faithful the reproduction is to the extremes, the better the system will perform in the range that counts for the audiophile's hearing. The average hearing range is typically from 40 to 17,000 Hz.

The bottom line for your customer might be summed up in the phrase, "hearing is believing." Let the customer base their decision on what they hear, not on the figures alone. Remember, most customers do not buy our speakers because they are audiophiles. On the contrary, they are generally ordinary people who know what they like when they hear it.

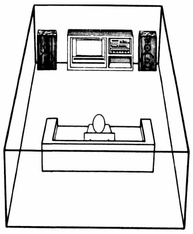
Qualify your customer's speaker needs, not only from a hearing viewpoint but also from a consideration of what kind of music they prefer. Hard rock played at high levels is going to demand a different guideline than will easy-listening background music at moderate levels. Use this information to demonstrate the speakers properly. Choose the proper format of music you plan to demonstrate to your customer, based on the customer's personal taste.

The customer's listening environment should also influence your demonstration. Is the customer choosing speakers for a college dorm? Are the speakers to be used in a spacious living room with a cathedral ceiling? Match the customer's living space, preferred playing volume levels, and general personal taste, to a pair of speakers. Your customer will profit from it and so will you.

Customer Questions

Some common questions often encountered about speakers are:

"Does placement affect the sound? How far apart should speakers be in order to get great sound?"



Placement does affect sound. Too close together and the stereo effect is diminished or even lost. Too far apart and there appears to be a sound "hole in the middle." So what is right? Generally, speakers should be as far apart from each other as the listener is from the mid-point between the speakers. Placing speakers along the same wall and on the floor will emphasize the bass. A little experimenting by your customer reveals the best setup for their room and system.

"What size speaker wire should I use?" The choice of speaker wire gauge depends upon how far the speaker is from the amplifier/receiver. In most cases, for distances less than 50 feet and with amplifier power less than 50 watts, 18 gauge is adequate. For greater distances, or higher power, consider using 16 gauge.

"Is the color of the terminals important? How do I know what wire goes where?" Typically, speakers have two terminals. One is designated +, or positive, and may be marked in red. The other is marked in black and is -, or negative. When connecting left and right speakers, be sure that the same + terminal goes to the same post on the amplifier's left or right channel, and the - terminal of each speaker goes to the respective left and right common terminal. Keeping all the + together and the - together assures that the left and right speakers will be in phase. That means that, for a given signal, both the cones of the left and right speakers will move forward together and back together at the same instant.

Out of phase speakers (where the wires are connected from positive receiver terminals to negative speaker terminals and vice-versa) have a dull sound and lack bass impact. You may want to intentionally hook up a speaker system incorrectly for a few minutes just to compare the sound.

A customer may ask about ferro-fluid cooling. The movement of the speaker within its frame generates heat due to friction. And excessive heat is a major problem in speaker failure. Speakers with ferro-fluid cooling can be driven harder with a dramatically reduced failure rate. That means longer life and greater reliability.

"What is the purpose of the tweeter and mid-range level controls?" They allow custom-tailoring of the sound produced by each element by either increasing or decreasing the volume level to that specific element. They are sometimes referred to as an L-Pad.

A customer may say, "I happened to remove one of the individual speakers out of the enclosure. Looking on the speaker element itself, I noticed that the rating was far different than the rating of the speaker system. Why?"

Take a 100-watt receiver. If you have a two-way speaker system, the power is distributed between the woofer and tweeter as follows: the woofer receives approximately 80% of the total power being delivered to the speaker, which is 80 watts. The tweeter receives the remaining 20% of the power or 20 watts.

In a three-way system, power is distributed as follows: approximately 75% goes to the woofer, 15% to the mid-range, and only 10% to the tweeter.

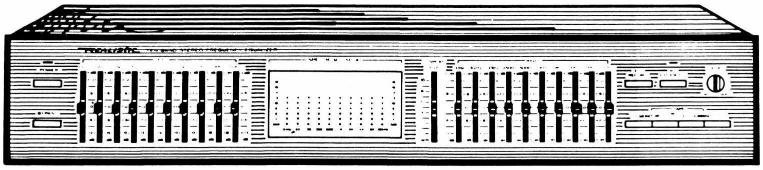
Use a stereo speaker switch control to dramatically show the difference between speakers. But don't confuse the customer by comparing more than two pairs of speakers at the same time. It has been proven that no person can remember the kind of sound made by more than two different pairs of speakers for the purpose of making a comparison.

Involve your customers by letting them remove the grille cover and look inside. Point out and explain the general meaning of the different elements as well as the benefits of the enclosure design.

Don't forget to mention the cabinet design, the construction-like genuine wood veneer instead of the vinyl finish used by most competitors.

Emphasize the full five-year warranty on parts and labor. That's impressive evidence, not only of the quality of the speaker, but also of the confidence that Radio Shack has in the product we design and build. That says a great deal. Show enthusiam for your product and get your customer excited about what great opportunities there are at Radio Shack for investing in products of value.

EQUALIZERS



An equalizer is a hi-fi component that contains a group of sophisticated tone controls. Each control affects only a selected frequency range, and there are often separate left and right controls for each range. An equalizer can be used to adjust the sound for personal taste, but it is also capable of compensating for unusual room acoustics or poor recordings.

There was a time when costly and elaborate equalizers were used mainly in professional recording studios. There, they were used to tailor the recording to suit the taste of the engineer or artist. But now, because of advances in technology and the ability of manufacturers to price them for consumer use, the benefits of an equalizer can be brought to your customer's home.

Seldom are our homes designed by audio engineers. As a result, the acoustics of the customer's living room will not match either the engineer-designed sound chamber or the furniture-less display floor of the retail store where the system was heard by the customer. The equalizer allows the customer to be their own audio engineer. It compensates for the imperfections of the home listening area due to the shape of the room, the materials that cover the windows, or the size and bulk of the furniture. Equalizers restore that last bit of sparkle that is lost when the perfect system is brought home.

What does an equalizer do?

What is an equalizer and what does it do? An equalizer resembles, on the surface, just another component. But instead of a few knobs or buttons, its panel is filled with slide controls. These are very sophisticated tone adjustment controls.

Most receivers or amplifiers have bass, midrange and treble tone controls. A tone control can emphasize (boost) a range of sound. Or, by rotating the control in the opposite direction, it can de-emphasize, or cut, that range of frequencies.

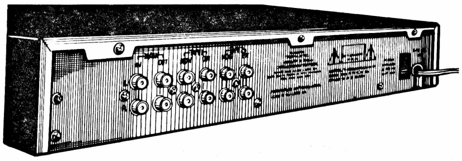
If you rotate a treble control clockwise, away from the center or "flat" position, you will hear the entire upper end of the sound become suddenly crisp and bright. If the boost gives too tinny a sound, turn the control completely counterclockwise. The sound loses its high end and just the upper mid-range remains.

With a bass control, you may have to settle for boomy bass or, thin, weak bass. Both treble and bass controls suffer from their inability to be more exacting in their action. It's like slicing an apple with a chain saw.

Imagine if you could take that single control and break it up into three different controls, completely independent of each other. Each control is designed to address a narrow section of the treble and bass end of the audio spectrum. Then duplicate the setup for the left and right channels. You have just created an equalizer.

An equalizer can improve almost any music system in three ways:

1. it can help compensate for poor room acoustics. Sound is affected by the shape of the room, carpeting, drapes, and furniture;
2. an equalizer can offset some unexpected deficiencies in your customer's music system, such as mediocre bass response; and
3. it allows customers to manipulate the total sound of the system to suit their personal taste.



Refer to the owner's manual for complete amplifier/receiver, CD player, cassette deck and VCR connections by using the Tape Monitor input/output jacks. Be sure to review the connection of a turntable. A turntable cannot be connected to an equalizer. It can only be connected to an amplifier/ receiver by way of the Phono In jack.

Tape Monitor

Once connected to the jacks, press the TAPE MONITOR button on the receiver. Now the equalizer is part of the path the signal takes as it is processed through the receiver. The Tape Monitor button is used to listen to the output from the component system. Use this feature to hear recordings as they are being made.

What does an equalizer do that is different from a tone control on the receiver? The equalizer takes those three tone controls and divides the job of one control into several. Now, instead of three knobs (one for bass, one for mid-range, and one for treble), there are many slide controls for each channel.

All of a sudden it is possible to fine-tune the sound by boosting or cutting that ONE part of the treble or mid-range or bass, using the one slide control designed just for that small slice.

Raise a control above the 0, or flat response position, and the result is a little more bass. Lower another just a bit for less treble. At one time the setting of the controls resembled the points of a graph and are often referred to as "graphic equalizers."

The design of the equalizer determines its flexibility in performance. The more frequency controls it has, the more detailed sound can be achieved from the system.

Besides the benefit of sound improvement, what other features can equalizers offer?

Bypass Switch

Most equalizers have a bypass switch which allows you to quickly hear the difference between the "before" sound and the equalized sound. It is the fastest way to demonstrate the advantage created by the equalizer to your customer.

Built-in Tape Monitor

The majority of the most sophisticated amplifiers/receivers have a single tape monitor section. When you have connected an equalizer to it, you have used up that facility of the amp or receiver. Most equalizers provide a built-in tape monitor section to compensate for the one on the amplifier/receiver that was occupied by the equalizer.

Why is this important? Because any type of add-on component which benefits the system or has record capability requires use of this in/out loop, such as a cassette deck or a reverberation device. The tape monitor is the only way to do it.

EQ Rec Button

Another great feature is the EQ REC button which means Equalized Recording. This feature routes the equalized signal to a tape deck, allowing you to record the equalized sound instead of the original sound.

For example, if you wanted to record something that sounded a little boomy or the vocals seemed washed out, you could improve it with the equalizer. The equalizer would cut several of the low frequency slides on each channel or boost several of the mid-band frequencies.

Light Emitting Diode/Spectrum Display

Some units have a means of visually displaying the effects of the controls. This Light Emitting Diode or Spectrum Display shows how a certain band is being boosted or cut. This spectrum display holds fascination for many customers who want to "watch" their music too.

IMX Stereo Expander

An IMX Stereo Expander, a special patented circuit, is also included on some of our models. When this circuit is engaged, it broadens the sound image. Your speakers seem suddenly further apart and much larger. The quality of a live concert is created. In a smaller room or with smaller bookshelf speakers, the use of an IMX Stereo Expander can greatly enhance any presentation.

What are your customers questions?

"If I want to improve my sound system, should I replace one or more of the components I already own, or should I enhance what I have with an equalizer?" Or putting it simply, they want to know, "What will an equalizer do for me?" Why should I invest more money in an equalizer?

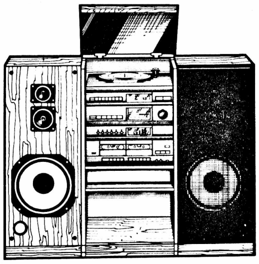
You should question customers about the components they already own. Although a good equalizer can compensate for deficiencies in a system, they should first consider upgrading to quality components.

If they cannot afford to do that, or if they are satisfied with the components they have, then an equalizer is needed.

However, they must have a tape monitor circuit on their amplifier or receiver.

The biggest selling feature is the effect the equalizer has on the original sound. You can quickly show this effect with one push of the bypass switch. So let them play with the bypass switch and the slide controls. They will sell themselves.

RACK SYSTEMS



So far we've looked at audio from a component point of view. But there are many customers who do not have the desire to assemble all the components themselves or to look for a place to put them. Radio Shack has an answer for these customers.

Rack systems are compact, matched sets, purchased this way for convenience. Having been assembled by a single manufacturer, they contain components that look and operate well together. Rack systems usually come complete with everything the customer needs. All the customer has to do is plug everything together and turn it on.

In the past, audio systems were contained in a single cabinet. These "hi-fi consoles" enjoyed a great deal of success. Many of these consoles made good furniture pieces, but only fair audio systems.

A small but dedicated group of audio enthusiasts began searching for better sound quality by buying separate amplifiers and speakers. Soon separate parts for audio systems became widely available.

Why buy components or a rack system?

Some customers like to take advantage of the possibilities and choose various components from various manufacturers. For other customers, shopping for separate components is time-consuming and often confusing. They simply want a system in an integrated, compact format.

Components are simply parts of a larger system. It is more expensive to purchase different components than one rack system, but you can generally get more features and better specs. out of individual components, and often the interaction of the various pieces produces a better performance.

Qualify your customer's needs

Follow Radio Shack's 14 Steps to Selling. Whether you're selling individual components or an entire rack system, be sure to qualify your customer's specific needs.

How do you know what your customer's needs are? The easiest, most effective way is simply to ask. Most customers who come into the store are unsure of what they want or need and really don't know what questions to ask. At Radio Shack WE ask the questions. Find out what they're looking for, why they want it, and how they will be using the product. Only then will you have an idea of the products your customers will require to satisfy their needs.

For example, a customer says they want a stereo system. Ask a few qualifying questions, and you may discover that this person likes to throw parties. Ask them if they live in a house or an apartment, where they hold the parties, in what type and size of room the stereo will be in, and what type of music they enjoy? What components do they have an interest in? Do they have a preference for a certain size speaker cabinet?

Often customers will be looking for certain features that a friend has told them about or they've read about. They will be comparing what you tell them to what they've been told or read. But they won't tell you this up-front. So be sure to ask this very important question: "I'm sure you have a friend or neighbor who is rather knowledgeable about stereo equipment. Have they made any suggestions to you as to what they feel you need?" Do not hesitate to show respect for their friend's advice. Gain their confidence, and your position to convey the benefits and value of the product will become even stronger.

Gain the customer's trust by being a professional; show your desire to assist them in making the right choice. This will help break down the objection wall.

Then, along with the information gained in qualifying, you should be able to present and demonstrate a product that matches their needs. Tell customers about the merchandise in simple, non-technical terms so they understand.

Saying it plain and simple will get the customer involved. Let them push buttons and play the CD, record or tape. Paint them a mental picture of what it would be like to own the merchandise. Talk in terms of customer benefits, not just product features. This will help transfer ownership in the customer's mind and make them forget that you are the salesperson.

And don't forget to ask for the order. Your customers may love the system but they need help in making the final buying decision. Radio Shack has great audio products, so make money by selling them.

GLOSSARY OF AUDIO TERMS

A-B Repeat	Lets you repeat any segment of the CD without limiting you to the beginning or end of the tracks.
A/B Speaker Switch	Makes it possible for customers to add a remote pair of speakers in another part of their home.
Acoustic Suspension	A speaker design that uses trapped air inside the speaker to regulate woofer cone movement.
Adjustable Bias Switch	Lets you match the correct bias setting to the recording quality desired for the type of tape purchased.
Alphanumeric Display	Any display that shows both letters and numbers such as radio frequency, preset memory number, program source, signal strength, and any other information.
Amplifier	The electrical component in an audio system that supplies power to drive the speakers.
Amplifier Response	See frequency response.
Anti-Skating Force	A force which counteracts the natural tendency of a tonearm to move toward the center of a rotating record.
ASMS	Automatic Search Music System. Allows a cassette deck or CD player to electronically find the beginning or end of a selection while in the play mode.
Audible Search/ Audio Search	Locates a particular section of the music by playing the CD rapidly in either direction. Similar to cue/review for a cassette deck. It allows you to search through a track(s) of a CD or song of a cassette while listening to find a specific portion.
Auto Edit	Arranges tracks to fit the tape length you select for dubbing a CD onto a cassette tape for your personal use. Aids in the dubbing of a CD onto a cassette tape.

Auto Reverse	When the tape mechanism senses the end of the tape, when the end of the tape leader has been reached, instead of just stopping its travel, it stops the tape. And then by means of another motor or mechanical assembly, reverses the direction of the tape movement and plays the other side, automatically. This enables the cassette deck to play or record both sides of a cassette tape without the user having to turn it over manually.
Automatic Scanning	Push one button and the fast tuning feature starts it searching, either up or down the band, in increments of 0.2 MHz for FM and 10 KHz for AM, looking for the next available station.
Auto Space	A cassette recorded feature that lets you easily record a 2- to 5-second blank space between tracks on a tape. Such spaces are necessary for proper operation of ASMS feature on the cassette. See "ASMS".
Auto-Stop	Automatically stops a tape player when the end of the tape leader has been reached in the play mode.
Automatic Turntable	Provides automatic motion of tonearm by means of one control. The tonearm picks itself up and lowers itself automatically onto the record, and after play returns the tonearm to its resting position.
AV Dubbing Button	Lets your receiver copy a video cassette tape from one VCR to another.
Bass	The lowest portion of the audio spectrum (roughly 20-1000 Hz).
Bass Reflex	A type of speaker cabinet design that uses a precisely calculated hole, called a port, in the cabinet to optimize bass response.
Belt-Drive Turntable	A turntable with a flexible belt, similar to a large rubber band, connects the turntable motor to the platter, absorbs most of the motor's vibrations, and turns the platter.

Bias Signal	A high frequency signal that is mixed with the audio signal and applied to a cassette tape. This bias signal allows the audio signal to better saturate the tape. This produces a cleaner sound with a minimum of distortion.
Bypass Switch	Allows you to quickly hear the difference between the "before" sound and the equalized sound. Generally found on an equalizer.
Capture Ratio	The tuner's ability to discriminate between two signals on similar frequencies.
Cartridge	The device at the playing end of the tonearm that holds the stylus and converts the vibrations of the stylus, caused by the record grooves, to electrical signals.
Ceramic Cartridge	Cartridge used in modest lo-fi systems which usually use an inexpensive ceramic stylus.
Channel Separation	The ability of an amplifier, tuner, or other stereo device to limit the signal from one channel (right or left) from leaking into the other channel. The higher this rating is the better the stereo image will be.
Compact Disc	A standard 5" single or 3" diameter disc containing, on one side, digitally encoded information which is read by a laser beam of a compact disc player.
Continuous Mode Auto	Plays two cassette tapes in sequence without stopping. Some units will play a fixed number of cycles (both sides of the tape) while others will continue to play until the listener presses the stop button.
Counterbalance	A weight at the opposite end of a turntable's tonearm from the headshell and cartridge. This weight compensates for the weight of the headshell and cartridge, and adjustment of this weight lets you precisely set the tracking force (the pressure of the stylus on the record).

Crossover	Circuit within a speaker system which directs the proper part of an incoming audio signal (high, mid, and low frequencies) to the matching component speaker (tweeter, mid-range, and woofer).
Cueing	The ability to lower and lift the tonearm to and from the record surface, at a desired point.
Cue/Review	Lets you push fast-forward or rewind while in the play mode of a tape recorder/player to quickly search for specific sections of the tape.
Damped Cueing	Feature that allows the tonearm to lower itself gently onto the record surface instead of falling with no resistance. Also called viscous cueing. Opposite of positive cueing.
Decibel (dB)	Unit of loudness used to express relative levels of sound. Can also be used to define relative noise levels.
Digital	The conversion of a signal to a numeric form for recording, processing, or transmission. Also refers to a technique used in FM tuners to synthesize the frequencies needed for precise tuning and to display tuned frequencies in terms of numerals.
Digital Ready	A term referring to speaker systems. It is the ability to reproduce sounds to a great degree of accuracy of the original sound.
Digital-synthesized Tuning	A type of radio tuner that uses an extremely accurate crystal frequency source as a reference to synthesize all other frequencies. Similar circuits are also used to synthesize frequencies for TV/radio transmitters.
Direct-Drive	Method of driving the turntable in which the motor is attached to and lies directly under the platter, turning at exactly 33-1/3 or 45 rpm. It is virtually vibration-free.
Distortion	An undesirable difference between an original sound/signal and a reproduction of that sound/signal.

Dolby B-C NR	Works by making high-frequency sounds stronger during recording and softer during playback.
Dolby HX Pro	An automatic biasing technique that, during recording, adds signal headroom for high-frequency signals. This allows higher frequencies to be recorded at higher levels with less distortion without tape saturation.
Dolby Noise Reduction	A system that improves tape playback quality by increasing the recorded high frequency (treble) part of sounds and decreasing them during playback. This restores the original balance between highs and lows while simultaneously reducing added tape hiss during recording.
Dolby Surround Sound	Increases the realism of video programs by providing thrilling "theatre" effects from thousands of pre-recorded movies. This is done by sending directional sounds (music and dialogue) or main action sounds to the front left and right speakers, and by sending environmental sounds (thunder, street noise, etc.) to a pair of rear or side speakers. You are literally "surrounded" by sound. You feel like you are a part of the scene. That the activity happening on the screen is happening to you. This technology enhances regular stereo sound and lets your customer relive that "at the movies" feeling in their own home.
Double Auto-Reverse	When both decks have auto-reverse.
Dubbing Deck	Two transports in one chassis that let you copy from one tape onto another using one machine.
Dynamic Range	The difference in decibels (dB) between the softest and loudest sounds a sound source can produce without distortion.
Efficiency	The measurement of the amount of sound a speaker can produce in decibels for a fixed amount of power. This measurement is usually taken one meter from the speaker. The higher the rating, the more efficient the speaker is.
EQ Circuit	Special circuit that provides uniform energy output at all frequencies for rich, full sound even from mini-speakers.

Equalized Recording/ EQ Button	Allows you to route signals to an equalizer, then to a recording tape deck, so the resulting tape contains equalized material.
Equalizer	A hi-fi component that contain a group of sophisticated tone controls. Each control affects only a selected frequency range, and there are often separate right and left controls for each range. An equalizer can be used to adjust the sound for personal taste, but it is also capable of compensating for unusual room acoustics or poor recordings.
Equalization	The deliberate manipulation of a music system's response to produce a desired effect or to compensate for flaws in a listening environment.
Equalizer Bypass	An equalizer switch that allows you to compare the difference in sound between the original and equalized music source material.
Flat Response	Audio signal without any emphasis or de-emphasis. On an equalizer it would be the center or zero (0) position setting. On a receiver, it would be the halfway point on all tone controls.
Flutter	A wavering sound caused by small, rapid variations in the speed of a sound producing device. It is a distortion in the higher frequencies (6,000 Hz and above).
FM Mono	Instantly switches the FM tuner from stereo to mono operation.
FM Muting	Eliminates inter-station noise when tuning.
FM Tuner Sensitivity	The ability of an FM tuner to produce clear, clean sound from a weak signal. The lower the sensitivity rating the better the tuner is at receiving weak signals.
Frequency Response	Refers to how evenly the component reproduces different frequencies. The range of recorded audio frequencies is normally 20 to 20,000 Hz. This is the audible range.

Full Auto-stop	Full auto-stop shuts off the motor while disengaging the mechanism, stopping the tape in any mode: fast-forward, reverse, play and record.
Full-range Speaker	The speaker is an audio compromise in that it reproduces a wide range of the audio spectrum. It is incapable of delivering the overall quality provided by separate drivers.
Graphic Equalizer	Term given to equalizers because their slide controls, when used, resemble points on a graph.
Hall Effect	Recreates the depth and realism of a concert auditorium from almost any stereo source. Hall effect sound is best suited for recorded concerts and other music programs. In this mode, the front speakers provide a normal stereo effect while the rear speakers provide reverberation of the sound. This reverberation simulates the sound you might hear at a live concert.
Hertz	A unit of frequency equal to one cycle per second.
Hi-Blend	Reduces noise that might occur during FM stereo broadcasts in weak signal areas. This feature has no effect on AM broadcasts.
High Fidelity	The reproduction of sound with a high degree of faithfulness to the original sound.
High Filter	Filters out high frequency noise such as record scratch or tape hiss.
Hum	A low frequency noise that intrudes into reproduced sound.
HX Pro	Improves sound by recording more signal without "tape saturation" distortion.
Impedance	The resistance factor in a circuit.

IMX Stereo Expander	A special circuit included on some equalizers and receivers to broaden the sound image by adding a "live concert" quality to the music.
Index Display	Some CDs and laser discs are divided into smaller subdivisions than tracks. These divisions are marked by index numbers. If a CD player has an index display, you can search for and/or program play the CD beginning at this point. The display shows the current index number is place of the track number. You can then use audible search to locate the desired index.
Integrated Circuit Logic Control (IC Logic)	IC Logic is a mini-computer that helps control the features and functions of a product. Provides the deck with the ability to go from fast-forward to stop then to reverse without the customer having to press stop. In a tape deck, an IC can help control the motor functions to prevent tape wrap-ups.
Intro-Scan	Feature that allows you to preview the first few seconds of each song on a tape automatically.
Linear Tracking	Allows a turntable tonearm to move tangentially across a record surface in the same way the original master recording was made. Note: conventional tracking is where tonearm is stationary at one end and pivots across the record surface.
Loudness	A circuit in an amplifier/receiver that increases bass sounds at low volume levels. This compensates for the human ear's lack of sensitivity to bass sounds at low volumes. As the volume level is increased, the effect of this circuit decreases.
Low Distortion	An amount of distortion that is not audible. If an amplifier has low distortion even at its full rated power output, you get a cleaner sound from your system even at higher volume levels.
Magnetic Cartridge	Cartridge used on a turntable found in professional, better designed systems. A good magnetic cartridge delivers wide, flat response, and tracks very lightly to reduce record wear and insure prolonged stylus life.

Matrix Surround Sound	A feature that creates 4-channel (left, right, front, rear) from any stereo sound source. No special encoding, like that of Dolby, of the sound source is necessary. It is similar in function to IMX Expansion.
Maximum Power Handling Capacity	The maximum short-term power that a speaker can handle without failure.
Memory Presets	A tuner feature that lets you store favorite stations, frequencies, in memory and return to one of those stations by pressing a single button.
Mid-Range	The frequency range between bass and treble, generally 1000 to 7000 Hz.
Mono	A sound source coming from one speaker or the same sound source coming from a pair of stereo speakers.
Music Calendar	A visual display of all the tracks on the CD. In the programming mode, the music calendar displays only the tracks that are programmed. The music calendar lights up these numbers (tracks). Once the track has played, the number disappears from the music calendar.
Output Power Meter	Lets you monitor your system's output. This meter shows the approximate amount of power your receiver/amplifier channels are delivering.
Oversampling	The amount of times that the digital information on a CD is rechecked to assure accuracy in the processing of information.
Phasing	The proper connection of a pair of stereo speakers that allows the speakers to work together instead of against each other. In most cases, connecting the receiver's positive (+) terminals to the speaker's positive terminals and the receiver's negative (-) terminals to the speaker's negative terminals results in proper phasing. For a given signal, both the cones of the left and right speakers will move forward and back together at the same instant. Improper phasing causes the bass sound from one speaker to cancel out the bass sound from the other speaker, resulting in overall weak bass response.

Pitch Control	A variable control to fine-tune the speed that a record will rotate on a turntable platter. The turntable strobe confirms the proper setting of the control.
Platter	The circular, rotating part of a turntable that holds the record.
Play/Pause Button	Control that permits a compact disc to be stopped temporarily while its in the play mode and restarts the play again. It instantly begins the component or freezes the player.
Positive Cueing	Feature that allows the tonearm to fall down onto the record surface with no resistance. Opposite of damped/viscous cueing.
Power Amplifier	The section of a receiver or integrated amplifier that converts the low-level signal from the preamplifier into a high-level signal that can drive a speaker system. The power amplifier is more-or-less a passive unit and has no controls. It simply recreates the low-level signal, but at a higher power level.
Preamplifier	The control section of a receiver or integrated amplifier that allows you to adjust a signal's tone, balance, volume, and so on. As the name implies, the preamplifier makes all of these adjustments to the signal before it is sent to the power amplifier.
Program/Memory Button	Lets you choose which of the tracks on a disc are to be played and in what sequence.
Programmed Memory Tuning	The customer tunes the station one time, chooses a memory storage button one time from many different FM and AM possibilities, and locks the tuning information into that chosen location.
Quick-reverse	The tape reverses as soon as the leader tape has been detected.

Random Track Play/ Sequence Programming	A feature of a CD player that automatically arranges and plays the tracks on a disc in a random sequence. Another CD player feature, Sequence Programming, was called Random Sequence Programming on early CD players. This feature allows the user to program tracks to play in any sequence they choose. Of course, this is not "random" and that is why the name of this later feature has been changed.
Receiver	The main control center and power source of a music system. Typically combines a tuner, preamplifier, and power amplifier on one chassis.
Recording-Level Meter	A tape recorder indicator that displays the signal levels being recorded onto the tape from moment to moment.
IR Remote	Infrared remote control.
Repeat-Play	The ability to program a turntable to repeat one side of the record over and over again; or to automatically repeat the entire CD in sequence, any single track you select, or a series of tracks that you programmed.
Reserve Power	An instant surge of power which is needed to compensate for the changes in music to ensure distortion free output.
Reverberation	Sound which consists of a series of echoes simulating the repeated reflection of the original sound wave off the walls of the listening area.
Rumble	Low frequency noise which is part of an overall sound caused by a turntable. The lower the spec. the better.
Sampling Frequency	The speed at which the CD player can read or process the digital information on the disc. The sampling frequency is fixed for all CDs at 44.1 kHz.
Selectivity	The ability of a tuner to distinguish between and separate stations close together on the dial.

Semi-Automatic Turntable	Requires that you pick up the tonearm manually and place it on the record surface.
Sequential Play	Without auto-reverse, the deck will play Side 1 of Tape 1 and then Side 1 of Tape 2. On a dual deck with dual auto-reverse, it will play Side 1 of Tape 1, then auto-reverse and play Side 2 of Tape 1. Then, after Tape 1 is finished, it will automatically switch to Deck 2 and begin playing Side 1 and end with Side 2.
Shuffle Play	Randomly selects tracks from all of the loaded discs, in a multiple disc CD player. After one track plays, the CD player automatically selects another track from any loaded disc until it plays all tracks on all discs.
Signal Processing Rate	How fast the CD player can process the digital information on the disc. This rate is similar to the clock speed in a computer.
Signal-to-Noise Ratio	Refers to how much louder the signal is than the residual noise level. A higher signal-to-noise ratio means little or no perceivable background noise.
Speaker	A device that converts electrical impulses into sound. In a standard cone-type speaker, a piston connected to the cone is moved in and out by a magnetic field. The magnetic field is controlled by the signals from the amplifier. The resulting vibrations of the cone creates sound waves that are the music you hear.
Speaker Balancing	When the same signal is played through a pair of stereo speakers, the sound should appear to be coming from a single point somewhere between the two speakers. If the sound appears to be coming from a point half-way between the two speakers, the system is usually properly balanced for stereo sources.
Speaker Placement **Speaker Separation**	The physical distance between two stereo speakers. In most cases, it is best to make the distance between speakers about the same as the distance from a point half-way between the speakers to the normal listening area.

Spectrum Display	Feature of some equalizers that allows you to visually observe the sound level of different frequencies.
Stereo Harmonic Distortion	Similar to Total Harmonic Distortion (THD), which is the percentage difference of distortion between the original sound and the reproduced sound.
Strobe	Series of markings on the platter illuminated by neon light, used in conjunction with pitch control to make fine adjustments in turntable speed.
Stylus	The part of the phono cartridge that touches the record groove. Also called needle.
Subsonic Filter	Filters out low-frequency noise caused by turntable rumble or tonearm resonance. Also called low filter.
Synchro-start	Feature that allows the listener to push one button to start both cassette tapes at the identical time for fast dubbing action.
Tape Bias	A high frequency bias signal which is mixed with the audio signal and applied to a tape. This bias signal allows the audio signal to better saturate the tape. This produces a cleaner sound with a minimum of distortion.
Tape Counter	Changes as the cassette tape moves and can be used to locate specific sections of the tape.
Tape Dubbing	The act of copying a tape onto another tape. Dual cassette decks allow you to do this within a single component, or you can use patch cords to connect one tape deck to another. Receivers that have two sets of tape in/out jacks often provide a setting for easy dubbing between two connected decks. In most cases, you can listen to a different receiver source (AM/FM, phono, etc.) while dubbing a tape.
Tape Monitoring	Allows you to listen to the results of your recording instantly and be assured you've set the controls properly for best results early in the recording process.

Tape Type	Type I - normal bias or ferric-oxide tape Type II - high bias, chromium dioxide or metal type II Type IV - coated with a material containing metal particles opposed to chromium dioxide or ferric-oxide.
THD	Total Harmonic Distortion. A percentage difference of distortion between original sound and reproduced sound which includes harmonic frequencies not in the original frequency. THD occurs when the component introduces sounds into a recording that were not present originally.
Three-Way Speaker	A speaker that has a woofer for the low range sounds, a tweeter for the high range sounds, and a mid-range for the sounds in between.
Tonearm	The part of a turntable that supports the cartridge and allows the cartridge with its stylus to follow the grooves of a record as the record rotates.
Tone Control	Means of adjusting the relative level of bass, mid-range, and treble frequencies with respect to overall sound level.
Tone Defeat	A control that temporarily returns the amplifier/receiver to a flat response without disturbing the actual tone control setting. Similar to Bypass button on an equalizer.
Track Access	Instant access to any song on a compact disc with the press of the track button.
Track Selector Button	See ASMS. Finds selections quickly. By pressing the track selector button, the CD player skips to the beginning of any track before or after the track presently being played.
Tracking Force	The vertical force in grams exerted by the stylus on the record surface.
Treble	The higher audio frequencies, above 7,000 Hz.
Tri Spot Laser Tracking	A single laser that splits into 3 beams which is necessary for the reading and tracking of the digital information on the compact disc.

Tuned Port	An opening of a specific size in the front wall of a bass reflex speaker so sound waves in the cabinet are allowed to exit through the front, in step with those originally moving forward, to get the best bass response.
Tuner	The part of a receiver that receives AM and FM radio signals.
Turntable	A record-playing device consisting of a motor-driven platter and a tonearm that supports the cartridge and stylus.
Tweeter	Speaker element built specifically to reproduce the higher frequency sounds, such as violins and flutes.
Two-Way Speaker	A speaker with a woofer for the lower and lower mid-range sounds and a tweeter that reproduces the high range and upper mid-range sounds.
Video Dubbing	The receiver can dub a video cassette tape from one video player/recorder to another.
Viscous Cueing	Allows the tonearm of a turntable to slowly lower itself to the record surface, avoiding the chance for damage to the stylus or the record.
Watt	A unit of acoustical or electrical power.
Woofer	Speaker element built specifically to reproduce the lower range sounds, such as drums and bass instruments.
Wow	A distortion in reproduced sound consisting of a slow rise and fall of pitch caused by speed variation in the reproducing device. The measurement of slow speed variations. It is the distortion in the lower frequencies (below 6,000 Hz).

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AUDIO CERTIFICATION EXAMINATION

Directions: To complete this examination you must have an Audio Certification Scantron Form and a Number Two Pencil. Obtain these from your store manager. Complete the header information. Please PRINT all information on this form. Select the best answer by filling in the correct answer choice. If you need to change an answer, completely erase your incorrect answer and fill in the correct answer. Make sure that there are no unnecessary marks on this form. There are 120 questions on this Audio Certification Examination. Each question is worth one (1) point. A perfect score is 120, and passing is 108 or better.

1. Which of the following ranges represents the best frequency response?

   a. 70 - 13,000 Hz.
   b. 60 - 14,000 Hz.
   c. 25 - 19,000 Hz.
   d. 20 - 19,000 Hz.

2. The higher the bias of the tape, the lower the frequency response.

   a. True
   b. False

3. The ability to scan a tape during the play mode is referred to as:

   a. ASMS
   b. Blank Scan
   c. Cue/review
   d. Intro Scan

4. Which form of cueing slowly lowers the tonearm of a turntable to the record surface, avoiding any damage to the record or stylus?

   a. IC Logic
   b. Positive
   c. Viscous

5. When tapes are played on a tape deck equipped with Dolby B-C NR system, the audio signal is restored to its original loudness level and the noise is reduced in loudness by the same amount.

   a. True
   b. False

6. An equalizer can improve a music system in all of the following except:

   a. compensate for poor music acoustics.
   b. effect some unexpected deficiencies in your customer's music system.
   c. eliminate the need for a Tape Monitor Control.
   d. allow the customer to manipulate the total sound of the system to suit their personal taste.

7. Which feature lets you find a particular section of the music by playing the CD rapidly in either direction?

   a. Bi-directional Audible Search
   b. Play/Pause
   c. Shuffle Play

8. Name the circuit that directs frequencies to the speaker which is designed for that range of frequencies.

   a. 3-Way Speaker
   b. 2-Way Speaker
   c. Crossover Network
   d. Full-range Speaker

9. Which feature on a dubbing deck lets you automatically copy both sides of a tape?

   a. Auto-reverse
   b. Double auto-reverse
   c. Quick-reverse
   d. Synchro-start Dubbing

10. Which S/N ratio represents the cleanest sound?

a. 64 dB
b. 70 dB
c. 78 dB
d. 79 dB

11. Which of the following ranges represents the best amplifier response?

a. 20 - 20,000 Hz.
b. 40 - 20,000 Hz.
c. 60 - 20,000 Hz.
d. 80 - 18,000 Hz.

12. High-speed dubbing in a dual deck means that you can duplicate a tape in:

a. 1/4 the time.
b. twice the time.
c. 1/2 the time.

13. Maximum power-handling capacity refers to the minimum long-term signal power that a speaker can handle without danger.

a. True
b. False

14. Failure to match the equalized and unequalized sound levels might result in damage to your amplifier/receiver and/or speakers.

a. True
b. False

15. Which of the following represents the best capture ratio?

a. 3.5 dB
b. 3.0 dB
c. 2.5 dB
d. 2.0 dB

16. In the belt-drive system, the motor is coupled directly to the platter making it virtually vibration free.

a. True
b. False

17. Identify the feature that lets the operator listen to the first few notes of each song.

a. ASMS
b. Audible Search
c. Cue/review
d. Intro Scan

18. In the programming mode which feature displays only the tracks that you have programmed?

a. Digital Display
b. Index Display
c. Music Calendar

19. Which feature determines what type of tape is being played and makes the corresponding adjustments?

a. Auto Tape Bias Selector
b. Dolby NR
c. HX Pro
d. IC Logic Control

20. Placing speakers along the same wall and on the floor will de-emphasis the bass.

a. True
b. False

21. Which feature enables the stylus to contact the record groove in such a way as to bear equally on both side-walls reducing wear on the stylus as well as on the record grooves?

a. Anti-skating Force
b. Counterbalance
c. Linear Tracking
d. Tracking Force

22. Which measurement tells you about the tuner's ability to discriminate between two signals in the same frequency?

a. Amplifier Response
b. Capture Ratio
c. FM Tuner Sensitivity
d. S/N

23. By using Sequence Programming, you can replace any of the programmed tracks with a new track.

a. True
b. False

24. When equalizing your system, it does not matter if you make more increases than decreases in the frequency control settings.

a. True
b. False

25. A cassette tape recorded with the Dolby HX-Pro system can only be used on cassette players with the Dolby HX-Pro feature because of the encoding process used.

a. True
b. False

26. It does not matter which speaker wire you connect to the receiver. They are all the same.

a. True
b. False

27. Most equalizers have a Bypass Switch which:

a. allows you to hear the difference between the "before" sound and the "equalized" sound.
b. allows you to record the equalized sound instead of the original sound.
c. broadens the sound image.
d. enhances any music presentation.

28. Which specification measures the tuner's ability to discard unwanted signals?

a. Capture Ratio
b. FM Tuner Sensitivity
c. IF Rejection
d. Stereo Harmonic Distortion

29. Which feature allows you to dub a CD onto a cassette tape by fitting the tracks onto a standard cassette tape?

a. A-B Repeat
b. Auto Edit
c. Intro Scan
d. Track Selector

30. Which of the following measurements of Wow and Flutter indicate a more accurate reproduction of sound?

a. 1.0 %
b. .15%
c. .12%
d. .06%

31. A turntable should be connected to an equalizer through the Tape Monitor Input/Output Jacks.

a. True
b. False

32. Name the cartridge that tracks lighter and prolongs the life of a record.

a. Ceramic
b. Magnetic

33. The term showing the tuner's ability to produce clear, clean sound from a weak signal.

a. Amplifier Response
b. Capture Ratio
c. FM Tuner Sensitivity
d. IF Rejection

34. For stronger bass, place the speakers in the corners of the room.

a. True
b. False

35. Speakers with ferro-fluid cooling can be driven harder with greater reliability and less failure.

a. True
b. False

36. Tri Spot Laser Tracking uses a single laser beam directed into 3 beams which reads and tracks the digital information on the disc.

a. True
b. False

37. This feature stops the tape in any mode.

a. Auto-stop
b. Full Auto-stop
c. Auto-eject

38. Name the control that allows you to hear the recordings as they are being made.

a. Bypass Button
b. EQ Rec Button
c. Graphic Equalizer
d. Tape Monitor

39. Which operation allows you to press one button without having to lift the arm of the turntable and place it on the record?

a. Automatic
b. Semi-automatic

40. Loudness is the control that gives you marked increase in bass at the lower levels.

a. True
b. False

41. Speakers should be about the same distance apart as the listener is from the center position of both speakers.

a. True
b. False

42. Intro Scan lets you automatically put a 2-second pause between tracks on a CD player.

a. True
b. False

43. If the deck has sequential play, and auto-reverse capabilities on both compartments, it will play:

a. Side 1, Tape 1; Side 1, Tape 2.
b. Side 1, Tape 1; Side 2, Tape 2; Side 2, Tape 1; Side 1, Tape 2.
c. Side 1, Tape 1; Side 1, Tape 2; Side 2, Tape 2; Side 2, Tape 1.
d. Both sides of Tape 1, then both sides of Tape 2.

44. This feature routes the equalized signal to a tape deck, allowing you to record the equalized sound instead of the original sound.

a. Bypass Button
b. EQ Rec Button
c. IMX Stereo Expander
d. Tape Monitor

45. The term which describes the percentage difference of distortion between the original sound and the reproduced sound.

a. Rumble
b. Sensitivity
c. Stereo Harmonic Distortion
d. Wow and Flutter

46. To achieve maximum stereo effect, stereo speakers should be 8 feet to 10 feet apart in an average room.

a. True
b. False

47. Auto Edit allows you to record a CD onto a cassette deck that has 30 minutes of recording time per side. The CD player automatically programs all the tracks that can fit on the 30-minute time allotment.

a. True
b. False

48. Which of the following features provides the ability to switch directly from fast-forward to rewind without pressing stop?

a. Auto-reverse
b. Double Auto-reverse
c. IC Logic Control
d. Quick-reverse

49. The FM Mute control removes the interstation noise as you manually tune the FM band.

a. True
b. False

50. Excessive heat is a major problem in speaker failure.

a. True
b. False

51. Which is better, a 2, 5, 7 or 10 band equalizer?

a. 2
b. 5
c. 7
d. 10

52. Music Calendar is an important feature because your customer can see what tracks they have programmed in the visual display.

a. True
b. False

53. In Synchro-reverse high-speed dubbing, both tapes return to high speed when the tapes reverse.

a. True
b. False

54. Which feature lets you bypass any existing settings of the tone controls without disturbing their settings?

a. Bypass Switch
b. Tone Control
c. Tone Defeat

55. If you have a two-way speaker system, the power is generally distributed as follows:

a. Woofer 20%, Tweeter 80%
b. Woofer 40%, Tweeter 60%
c. Woofer 60%, Tweeter 40%
d. Woofer 80%, Tweeter 20%

56. A lower rating in channel separation means a better stereo image.

a. True
b. False

57. Quick-reverse machines rely on tape tension to detect the end of the tape.

a. True
b. False

58. Identify the feature that lets the listener electronically find the beginning or end of a selection in the play mode.

a. ASMS
b. Audible Search
c. Cue/review
d. Intro Scan

59. Which feature provides a cleaner sound when a stereo station is received with a weak incoming signal?

a. Bypass Button
b. FM Mono
c. FM Mute
d. Tone Defeat

60. The choice of speaker wire gauge depends on how far the speaker is from the amplifier/receiver and amplifier power.

a. True
b. False

61. Tape Monitor lets you hear the difference between the sound from the source and the sound that is being recorded.

a. True
b. False

62. In a 3-way speaker, the power is generally distributed as follows:

a. 55% to Woofer, 30% to Mid-range, 15% to Tweeter.
b. 60% to Woofer, 20% to Mid-range, 20% to Tweeter.
c. 75% to Woofer, 15% to Mid-range, 10% to Tweeter.
d. 80% to Woofer, 10% to Mid-range, 10% to Tweeter.

63. A recording feature which engages the original and the recording tape simultaneously is:

a. Bias Selector
b. Synchro-start
c. Tape Dubbing
d. Tape Speed Selector

64. What gauge is recommended for speaker wire distances less than 50 feet and with amplifier power less than 50 watts?

a. 12 gauge
b. 14 gauge
c. 16 gauge
d. 18 gauge

65. If the original cassette tape does not have Dolby NR, you can add it to the tape you are dubbing.

a. True
b. False

66. Dolby Surround Sound sends directional sounds, main action sounds, to a pair of rear or side speakers, and environmental sounds to the front left and right speakers creating an increase in the realism of the video program.

a. True
b. False

67. The metal setting in a high-end tape deck is compatible with which type of tape?

a. Type I
b. Type II
c. Type III
d. Type IV

68. What gauge is recommended for speaker wire for distances greater than 50 feet?

a. 12 gauge
b. 14 gauge
c. 16 gauge
d. 18 gauge

69. Hall Effect is best suited for recorded concerts because the front speakers provide a normal stereo effect while the rear speakers provide reverberation of the sound.

a. True
b. False

70. Being "In-phase" means that the proper connection of a pair of stereo speakers allows the speakers to work together instead of against each other.

a. True
b. False

71. The term which describes the alteration of a reproduced sound due to the distortion of harmonic frequencies is called:

a. Flutter
b. Hum
c. THD
d. Wow

72. A 100-watt receiver compared to a 50-watt receiver has:

a. double the loudness level.
b. more reserve power.
c. more RMS which reduces the distortion level.
d. double the speaker capacity.

73. Which feature allows the listener to automatically play both sides of two tapes in sequence without stopping?

a. Auto-reverse
b. Continuous Mode Auto-reverse
c. Quick-reverse
d. Sequential Play

74. The A/B Speaker Switch...

a. makes it possible for customers to add a remote pair of speakers in another part of their home.
b. permits the customer to make an instant A-B comparison between the original sound from the source against the sound that is being recorded on the tape.
c. instantly switches the FM Tuner from stereo to mono operation.

75. What kind of deck would you recommend to a customer that wants to copy from one cassette to another?

a. Auto-reverse Playback Deck
b. Dual Dubbing Deck
c. Recorder/play Deck
d. Single Transport Deck

76. The treble range can best be described as:

a. below 20 Hz.
b. 20 - 1,000 Hz.
c. 1,000 - 7,000 Hz.
d. above 7,000 Hz.

77. A feature that expands the capacity of a tape to accept higher frequencies:

a. Dolby HX-Pro
b. Dolby B
c. Dolby C
d. Dolby NR

78. The tape which is most suited to record a CD source on our best tape deck is:

a. Type I
b. Type II
c. Type III
d. Type IV

79. Which of the following frequencies would most likely represent a comparison of the S/N ratios for Dolby B and Dolby C?

a. 60 dB Dolby B, 70 dB Dolby C.
b. 80 dB Dolby B, 70 dB Dolby C.
c. 72 dB Dolby B, 72 dB Dolby C.

Matching: Choose the best answer.

80. Broadens the sound image.
81. Shows how a certain band is being boosted or cut.
82. Allows you to hear the difference between the "before" and "equalized" sound.

a. Bypass Switch
b. IMX Stereo Expander
c. Spectrum Display
d. Tone Control

Matching: Match these terms with their appropriate reading.

83. Frequency Response
84. S/N
85. Wow and Flutter

a. 69 dB Dolby B
b. 60 Hz.
c. 20 - 20,000 Hz.
d. .05% WRMS

Matching: Choose the best answer.

86. Reproduces the higher frequency sounds.
87. Reproduces the lower frequency sounds.
88. Two-way speaker.

a. Tweeter
b. Woofer
c. Woofer and Tweeter
d. Woofer, Tweeter and Mid-range.

Matching: Choose the best answer.

89. Helps find selections by skipping to the beginning of any track presently being played.
90. Randomly selects tracks in a multiple-disc CD player.
91. Lets you find the beginning or end of a selection while in the play mode.

a. ASMS
b. Audible Search
c. Shuffle Play
d. Track Selector

Matching: Choose the best answer.

92. Quick-reverse
93. Auto-reverse

a. tape reverses as soon as the leader tape has been detected.
b. reverses tape direction when a 10-second pause is detected.
c. tape reverses when the end of the leader tape has been reached.

Matching: Choose the best answer.

94. The cabinet is made airtight, allowing the woofer to have a dampened cone motion.
95. An opening in the front wall of a speaker.
96. The enclosure that makes use of the internal soundwave by use of a tuned port that the speaker cone creates.

a. Acoustic Suspension
b. Bass Reflex
c. Tuned Port

Matching: Choose the best answer

97. Slow variation in the constant speed.
98. Excess motor noise and vibration.
99. Fast variation in the constant speed.

a. Cueing
b. Flutter
c. Rumble
d. Wow

Matching: Match the tape type with its coating.

100. Type I
101. Type II
102. Type IV

a. Chromium Dioxide
b. Ferric-chrome
c. Ferric-oxide
d. Metal

Matching: Choose the best answer.

103. Lets you automatically arrange and play the tracks on a disc in any sequence.
104. Lets you automatically repeat the entire CD in sequence, any single track or a series of tracks.
105. Lets you repeat any segment of the CD without limiting you to the beginning or end of the track.

a. A-B Repeat
b. Random Track
c. Repeat Play
d. Shuffle Play

Matching: Choose the best answer.

106. Increases the realism of video programs by providing thrilling "theatrical" effects.
107. Creates the depth and realism of a concert auditorium from almost any stereo source.
108. Creates 4-channel from any stereo source. It is similar to the IMX Expander function.

a. Dolby Surround Sound
b. Hall Effect
c. Hi-Fidelity Sound
d. Matrix Surround Sound

Matching: Choose the best answer.

109. Lets you preview each song.
110. Lets you find the beginning or end of each song electronically.
111. Lets you manually find the selection you want.

a. ASMS
b. Cue/review
c. Intro Scan
d. Seek

Matching: Choose the best answer.

112. The downward force of a turntable's cartridge.

113. The force which is applied to the turntable arm to offset the natural tendency of the tonearm moving to the center of the record.

114. The weight located at the opposite end of a turntable's tonearm from the headshell and cartridge. This weight compensates for the weight of the headshell and cartridge.

a. Anti-skating Force
b. Counterbalance
c. Linear Tracking
d. Tracking Force

Matching: Choose the best answer.

115. Takes out the scratches of well-used records and some hiss from a noisy tape.

116. Insures that the low end is clean and free of power-robbing distortion.

117. Reduces the noise that might occur during FM stereo broadcasts in weak signal areas.

a. Hi-blend
b. High Filter
c. Low Distortion
d. Subsonic Filter

Matching: Choose the best answer.

118. The speed at which the CD player can read or process digital information.

119. Number of times the digital information on a CD is rechecked to assure accuracy.

120. Used to read and track the digital information on the disc.

a. Frequency Response
b. Oversampling
c. Sampling Frequency
d. Tri Spot Laser

NOTES

TAKING CARE OF OUR CUSTOMER

The 10 Commandments of Good Business

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1. Customers are the most important people in any business.
2. Customers are not dependent on us--
   we are dependent on them.
3. Customers are not an interruption of our work--
   they are the purpose of it.
4. Customers do us a favor when they call--
   we are not doing a favor by serving them.
5. Customers are a part of our business--
   they are not outsiders.
6. Customers are not cold statistics--
   they are flesh and blood human beings
   with feelings and emotions like our own.
7. Customers are not people to argue with
   or match wits with.
8. Customers are people who bring us their wants--
   it is our job to fill those wants.
9. Customers are deserving of the most courteous and attentive treatment we can give them.
10. Customers are the lifeblood of this and every other business.

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